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Manufacturing Developments in Coast Mills

Ronald G. Macdonald, Secretary of the Technical Association of the Pulp and Paper Industry and Technical Editor of the Paper Trade Journal Describes the More Outstanding New Features of the Pulp and Paper Plants of the Pacific North West Observed During His Recent Visit To That Rapidly Expanding Paper Section

Most articles that have been written concerning the pulp and paper industry on the Pacific coast have been individual plant descriptions, economic forestry reviews or general statistical surveys. This article will endeavor to outline the improvements that have been effected in equipment and processing during the past year or two. Descriptions of the equipment in some of these mills will be given only to illustrate the development. In practically every instance publicity in one form or another has been given to the information that follows. This article is intended to be survey of these developments and is believed to be quite complete except in so far as individual mill developments are concerned where publicity has not been authorized.

Much has been written about the rapidity of industrial growth in the region of Oregon, Washington and British Columbia. Even as this article is written at least two new pulp mills are under construction and additions and improvements valued at millions of dollars are being made in the established mills. Much of the speed in construction has been demanded to enable the new mill to begin utilizing waste lumber as soon as possible. It is quite likely that in the future the mills will be planned and erected to utilize to best advantage wood direct from the forest rather than saw mill refuse inasmuch as the supply of the latter is quite dependent on the economic situation in the lumber industry. The financial magnitude of the pulp and paper industry has undoubtedly impressed all who have been only recently connected with the industry that its capital and operating requirements places it in a class for major consideration rather than as a saw mill saveall. Many have undoubtedly learned from experience that the quality standard requirements of pulp users are high and definite. This realization has forced the industry on the Pacific to solve many local manufacturing problems that have had no precedence. That the solution is near is evident and there seems to be no doubt that the time is not far distant when the industry will be in a very stable condition and the product of most of the mills will be generally equal to the trades' requirements.

For several years it was fairly well understood that there were real difficulties to be met in any endeavor to pulp the woods of the Washington and Oregon forests consisting of Douglas fir, white fir, hemlock, etc. Both local and Eastern banking houses were convinced that money invested in new pulp and paper making plants would be unprofitable. It was only when a few far seeing and clear thinking men of the industry investigated the industrial prospects of these states that real activity was begun. To the so called promoter, a term that is somewhat disliked on the coast can be attributed much credit for the rapid growth of the industry. New capital has flowed into the territory and the long established companies have much more fully realized their great strategic advantage and opportunity and have expanded and utilized the most favorable sites.

In general it may be said that two distinct types of mill construction is in evidence. First there are the mills that are made to be permanent and represent an investment that is made by groups that have a true realization of the value of a well constructed and adequately equipped industrial plant. The second type is illustrated by mill units that reflect a sincere effort to get the most for the money, the latter being somewhat less than should be expended for this purpose. The first type of mills have for the most part been erected by old established companies that have an appreciation of the importance of sturdiness in building and machinery. The latter type of mills with one or two exceptions are a credit to the engineers who designed them who have evidently had to "cut many corners" in an endeavor to do the job with a limited supply of funds.

Several mills in this group seem to have been built essentially for the purpose of utilizing saw mill waste. Lack of familiarity on the part of the owners and often the operators with the market requirements of pulp has brought about a feeling that some Pacific coast pulp is carelessly made or made by mills inadequately equipped particularly with screens. It is pleasing to note, however, that practically all of the new pulp mills have taken cognizance of this situation and are going to extreme ends to counteract this situation by using a considerable amount of human labor to see that the wood used is free from bark, dirt and knots. In the exceptionally progressive mills of the Rainier Pulp and Paper Company at Shelton, Wash. and the Grays Harbor Pulp and Paper Company at Hoquiam, Wash., special planers have been developed to remove these things, every stick used having the individual attention of the wood room operators. This procedure which is more characteristically European than American is made possible at present and will be economic for a few years to come because of the relatively low cost of wood and labor.

An indication of the trend in the industry is given in the figures for present and planned production in Washington, Oregon and British Columbia.

	1929 Production	1930 Production	Per cent increase
Mechanical pulp	483,000 tons	483,000 tons	0
Bleached sulphite ...	166,500 tons	277,500 tons	66
Unbleached sulphite..	339,500 tons	347,500 tons	2
Sulphate	216,000 tons	270,000 tons	25
Soda	22,500 tons	22,500 tons	0
Total	1,227,500 tons	1,399,000 tons	15

The increase in production is based on the figures for the pulp producing capacities of the following companies.

BLEACHED SULPHITE	
Rainier Pulp and Paper Co., Shelton, Wash.....	13,500 tons (enlargement)
Olympic Forest Products Co., Port Angeles, Wash.	45,000 tons (new)
Puget Sound Pulp & Paper Co., Everett, Wash...	52,500 tons (new)
Total	111,000 tons
UNBLEACHED SULPHITE	
Spaulding Pulp & Paper Co., Newberg, Ore.....	7,500 tons (enlargement)
SULPHATE	
Willapa Pulp & Paper Co., Raymond, Wash.....	24,000 tons (new)
Umpqua Pulp & Paper Co., Gardiner, Ore.....	30,000 tons (new)
Total	54,000 tons

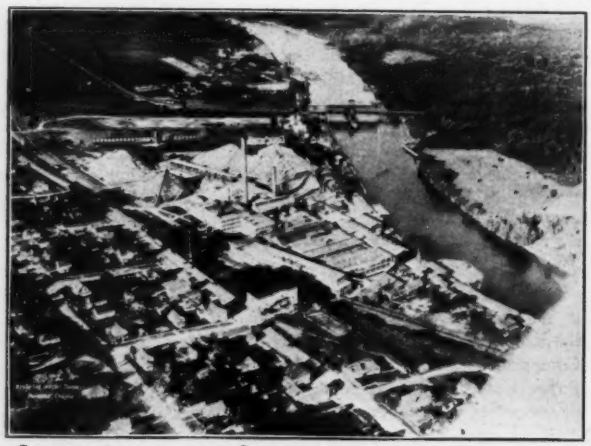
Courtesy: Brubaker Aerial Surveys.

WASHINGTON PULP & PAPER CO., PORT ANGELES, WASH.

Most of the new mills in the Northwest are of heavy concrete construction, the newer mills such as the National Paper Products Company mill at Port Townsend use a large amount of sash and are of V. D. Simons design.

The Shaffer Box Company mill was designed by L. A. DeGuerre and consists of three main buildings, the acid plant, chip room, machine room and digester room. Tile and concrete is used in the acid plant and the wet end of the machine room is of concrete. Supporting columns on the floor are dispensed with through the use of curved trusses and vaulted roofs.

The mill of the Union Bag and Paper Power Company at Tacoma was designed by Hardy S. Ferguson. The buildings are built of steel, red brick and reinforced concreted. Provision is made for future extensions of the mill by use of sheet metal siding made by H. H. Robertson Company.



Courtesy: Brubaker Aerial Surveys.

EVERETT PULP & PAPER CO., EVERETT, WASH.

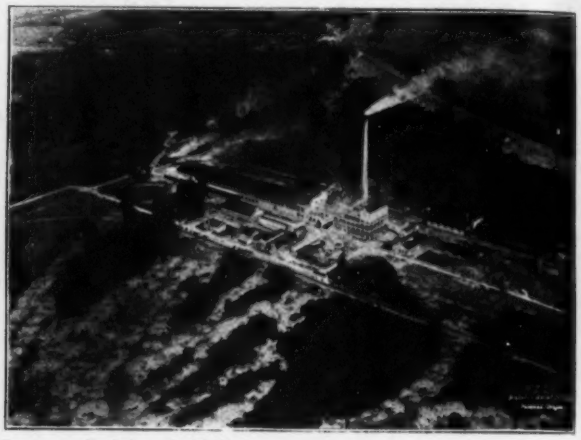
In the Grays Harbor mill a composition hood is placed over the paper machine driers together with an air handling system for removing the hot air and moisture. A composition inner roof is attached to the roof trusses which is to prevent drip and to be a temporary roof when repairs are being made on the roof. The roof is made of cedar. A traveling crane spans the width of the machine room and is accessible for any heavy lifting in the machine room.

Woodlands Operations and Chip Preparation

So important is the lumbering industry to the Northwest that much has been written concerning it but a few significant notes concerning it and its relation to mill operations need be included in this brief survey.

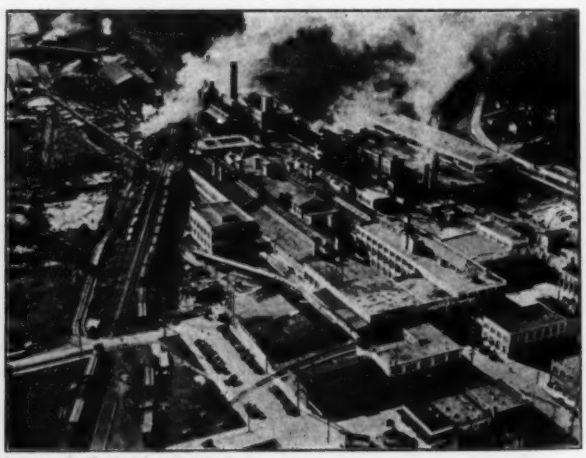
The new mill of the National Paper Products Company at Port Townsend and the news mill of the Washington Pulp and Paper Company at Port Angeles obtain a considerable amount of their wood from the Neah Bay district in Washington where the trees which are principally western hemlock and silver fir and some Sitka spruce, run approximately 80 cords to the acre. The average tree is about thirty six inches in diameter and many of the older spruce trees are from six to eight feet in diameter. This forest is made up largely of virgin trees some of which are about five centuries old. A tree six feet in diameter is very likely to produce more than 25 cords of pulp wood.

It is the general practice in this section to peel the wood in the



Courtesy: Brubaker Aerial Surveys.

LONGVIEW FIBRE CO. MILL AT LONGVIEW, WASH.

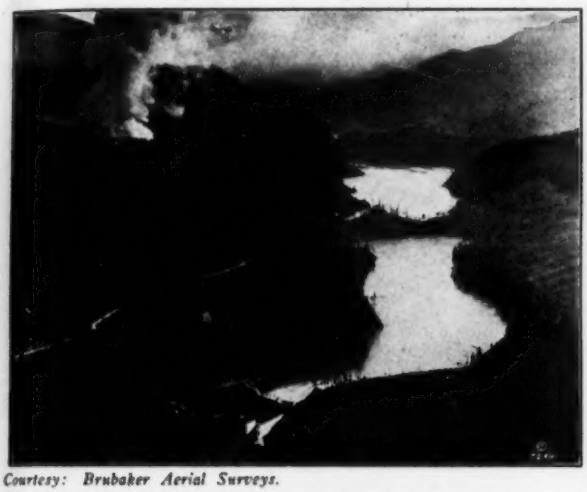


Courtesy: Brubaker Aerial Surveys.

CROWN WILLAMETTE PULP & PAPER CO., CAMAS, WASH.

forest and to convert it into four foot peeled cordwood which may be shipped in scows to the pulp mill. Recently a chipping plant of 300 cords capacity has been erected to prepare chips in the forest. The chipper is driven by a 500 horsepower Diesel electric unit. Two 88 inch Carthage chippers, crushers and screens prepare the chips for shipment to the mills.

The mill at Port Townsend does not have a chip preparing plant but receives chips from the Neah Bay and other districts by



Courtesy: Brubaker Aerial Surveys.

LAKES, POWER PROJECT AND FOREST FIRE ON ELWAH RIVER IN NORTH OLYMPIC MOUNTAINS IN WASHINGTON.

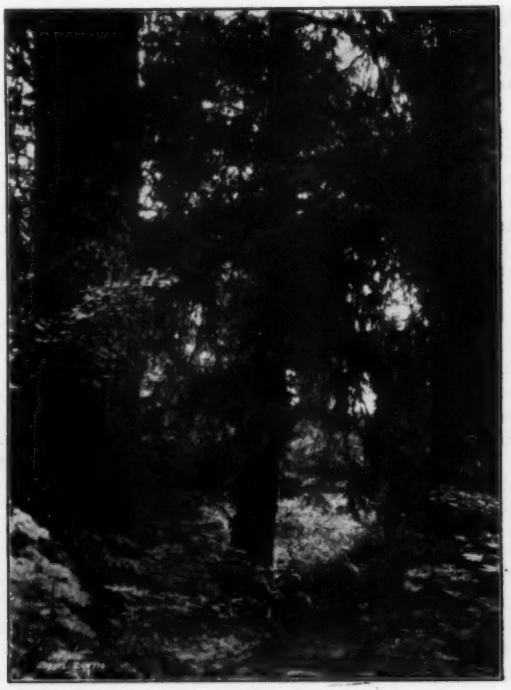
means of scows that unload their cargoes of chips and hog fuel in a storage building located on an artificial island in deep water about 110 feet from the mill. Four P. & H. monorail lines run from the island to the chip bins or to storage lines in the mill.

Courtesy: Brubaker Aerial Surveys.

TIMBER AND LOGGING EAST OF EVERETT, WASH.

Electric cars run on these rails and by means of buckets transfer chips from the island storage building to a storage bin in the mill. From here the chips may be distributed by a belt conveyor to several storage places. Three Kellogg digesters are located in the storage shed to facilitate delivery of chips for cooking.

The various sizes of the sticks being delivered to the chippers has made it necessary to provide many of the mills with various size chippers and in many cases to provide mechanical feeds so that even pressure is exerted on the chipper blades and so that

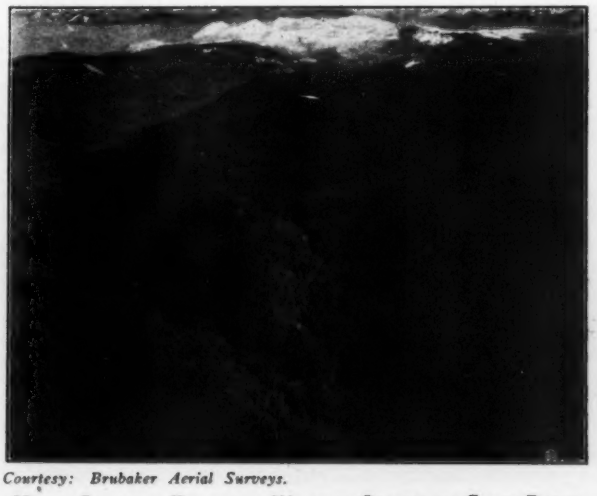


Courtesy: Pacific Pulp & Paper Industry.

SITKA SPRUCE TREES IN THE HOH RIVER VALLEY IN WASHINGTON.

the sticks will not vibrate too much or be knocked out of the chipper spouts.

The Shaffer mill is equipped with two 64-inch chippers. The Union Bag mill equipment consists of one Carthage 110-inch cast steel disc chipper and one Allis-Chalmers drum slab chipper equip-



Courtesy: Brubaker Aerial Surveys.

HEAVY STAND OF TIMBER IN WESTERN OREGON ON COAST RANGE.

ped with a positive power feed. The chips are handled in six Sturtevant Vibro screens, the oversize being passed through two Carthage chip crushers and returned to the screens.

Barkers

At the Union Bag and Paper Power Company's mill there are two slab barking drums to handle the slabs as they come from the saw mill. These drums are especially built to handle slabs and are shown in the illustration. The bark from this press is handled in a Giant Nekoosa bark press which is entirely auto-

matic in operation and reduces the moisture content of the bark from the drums to fifty percent which makes it suitable for use as fuel. Both the press and barking drums were made by the Fibre Making Processes, Inc., Chicago.

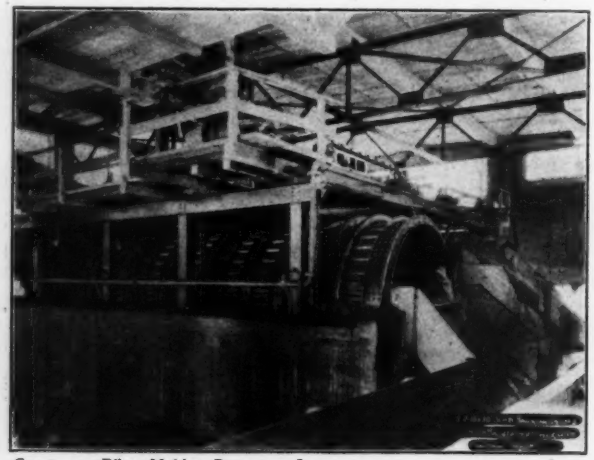
In the Shaffer mill there are a number of machines specially designed by Mr. Pangborn to handle the small and irregular shaped edgings that are partly covered with bark. One of these machines known as the Pangborn slab barker has a series of planer heads, each two inches thick and ten inches in diameter. These planer heads are staggered in such a way as to have each one remove bark from a different part of the slab and to keep waste at a minimum each head engages the curvature of the slab. Each planer head is directly coupled to a driving motor and each planer and motor is swung on a free pivot so that the planer heads ride the slabs with a fixed weight. The slabs are fed in under the planer heads.

The other Pangborn machine is designed to remove bark from edgings. It has a series of small curved knives mounted 1¾ inches apart around the inside of a cylinder, or ring, which is about two feet inside diameter. The ring and knives rotate at a linear speed of 3800 feet per minute. One man feeds sticks into the barker while another pulls them through.

Pulp Wood and Hog Fuel

Of special interest in regard to new developments in supplying West Coast mills with wood chips and hogged fuel is the equipment installed for automatically weighing these materials. Merrick weightometers are used for weighing chips at the mills of the Longview Fibre Company, Longview, Wash. and Grays Harbor Pulp and Paper Company. At Longview the weightometer is also used for weighing sulphite laps and at the Crown Willamette mill at Camas, Wash., Grays Harbor Pulp mill at Hoquiam, and the Washington Pulp and Paper Company at Port Angeles they are used for weighing hogged fuel.

A good example of the way in which waste lumber is utilized for pulp manufacture is illustrated in the new mill of the Shaffer Box Company at Tacoma, Wash. For many years this company has been engaged in the manufacture of lumber and box shooks.

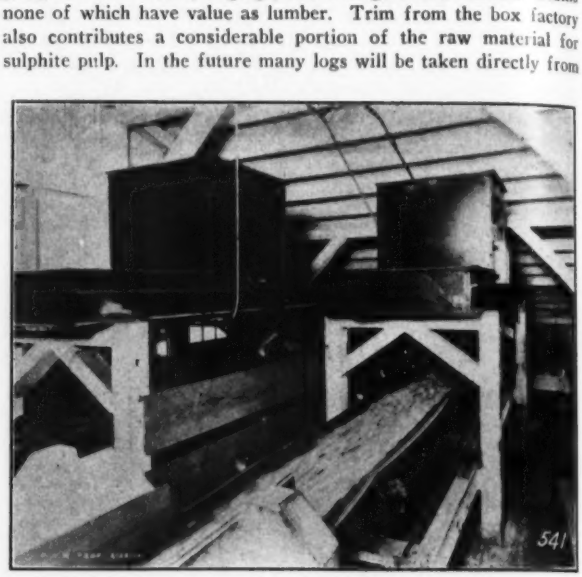


Courtesy: Fibre Making Processes, Inc.

2—10 FT. x 30 FT. SLAB BARKING DRUMS. UNION BAG & PAPER POWER CORP., TACOMA, WASH.

About 200,000 board feet of lumber is cut daily comprised entirely of western hemlock. To take care of the waste wood a large refuse burner was maintained at a cost of six thousand dollars annually for maintenance alone and not including the cost of handling and conveying the wood to the burner. Because of the low power costs in Tacoma it was not profitable to generate power from steam.

Waste wood in a lumber mill may be classified into several groups such as slabs, edgings, short lengths and narrow widths none of which have value as lumber. Trim from the box factory also contributes a considerable portion of the raw material for sulphite pulp. In the future many logs will be taken directly from



MERRICK WEIGHTOMETERS AT GRAYS HARBOR PULP & PAPER CO., HOQUIAM, WASH. ONE IS USED FOR LOGGED FUEL AND THE OTHER FOR WOOD CHIPS.

the pond and sent to the pulp mill because of their unfitness for lumber.

In addition to the pieces of wood satisfactory for the pulp mill there is a considerable amount of material consisting of sawdust, shavings, edgings, bark and very small or large knotty sticks that accumulate in the wood preparing operations. Two 45 inch hogs made by the Sumner Iron Works reduce the waste material to a condition suitable for burning under 500 horse power Sterling type water tube boilers, operating on 175 pounds steam pressure. Inclined step grates are used for carrying the hog fuel through the combustion chamber.

The hog fuel is stored in a bin 100 x 30 x 66 feet high. A special conveyor designed by R. H. Pangborn, vice president and general superintendent of the Shaffer mill is used to load and unload the bin. This conveyor is made up of cast iron flights connected with short lengths of chain and are removable.

Digesters and the Cooking Process

In the new sulphite mills there has been a trend toward large digesters but it is the opinion of several operators that smaller digesters will be installed in mills that will be built in the future.

The Shaffer mill is equipped with two Willamette Iron and Steel Company digesters each 16 feet in diameter and 51 feet high having a capacity of thirteen tons per cook. The linings were put in by Stebbins Engineering Company, and the fittings are made of bronze and supplied by the Doran Company of Seattle. Remote control is used to operate the blow valves from the second floor.

The Sitka Spruce Pulp and Paper Company at Empire, Oregon will have two sulphite digesters of the same size as those installed in the Shaffer mill. The new digesters in the Newberg, Oregon mill of the Spaulding Pulp and Paper Company is 15 feet in diameter and 49 feet high and has a special type of top nozzle with side outlets and last month a new digester was completed for the Rainier Pulp and Paper mill at Shelton, Wash., which is 18 feet in diameter by 58 feet high. In the plant extension of the Crown Willamette mill at Camas, Wash., a digester 19 feet by

58 feet will be installed and is designed for 110 pounds working pressure.

At the Union Bag mill kraft pulp is manufactured by the Morterud system of the Fibre Making Processes, Inc. As shown in the illustration this system provides for running the process steam into a heater located outside of the pulp digester. The cooking liquor is withdrawn from the bottom of the digester and circulated through the heater and subsequently through the digester by means of a circulating pump. In this way the cooking liquor does not become diluted and less steam is required for its evaporation after it is separated from the pulp. At the Port Townsend plant of the National Paper Products Company six Morterud systems are in operation.

The sulphate digesters at the Union Bag mill were made by Blaw-Knox Company and are of the hammer welded stationary type, ten feet inside diameter by 45 feet high designed to work under a working pressure of 150 pounds per square inch with a shell plate thickness of 1¼ inches and heads of 1⅜ inch thick plate. These digesters are equipped with Yarway steel blowoff valves. Similar digesters are installed in the Longview Fibre Company mill 9 feet 6 inches by 35 feet 6 inches high. The plate specifications are the same but the digester is designed for 165 pounds pressure. All the operations such as fitting, steaming and blowing are controlled from one floor.

In the Union Bag mill a cylindrical blow tank 20 feet diameter by 35 feet in height receives the blow from the digester. The pulp is pumped from here to washers. The non-condensible gases and exhaust steam pass through a cyclone trap and two Wheeler condensers, each of which has a cooling surface of 3200 square feet where the steam is condensed and discharged to the sewer. The non-condensible gases are led into the Wagner furnaces where they are consumed and the odor therefrom eliminated.

Kellogg stationary forge and hammer lap-welded steel digesters are installed in both units of the National Paper Products mill at Port Townsend. Cooking is accomplished by the Morterud system. Both douglas fir and western hemlock are being cooked in varying proportions to make various grades of kraft papers and liners.

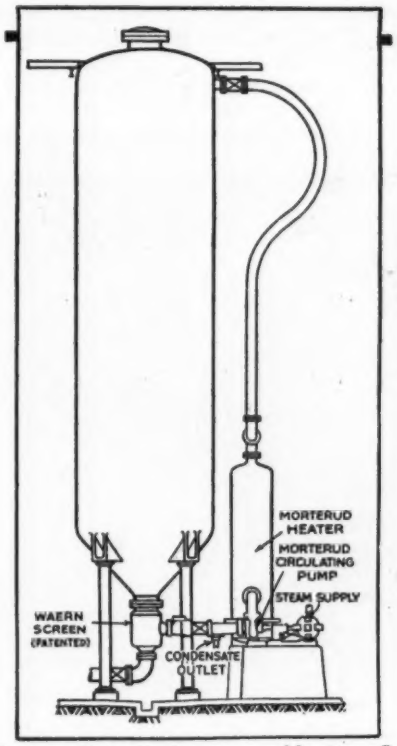


Diagram Showing Digester Layout for Morterud System Used at Union Bag & Paper Power Corp., Tacoma, Wash.

Morterud Pumps. Union Bag & Paper Power Corp., Tacoma, Wash.

Morterud Heaters. Union Bag & Paper Power Corp., Tacoma, Wash.

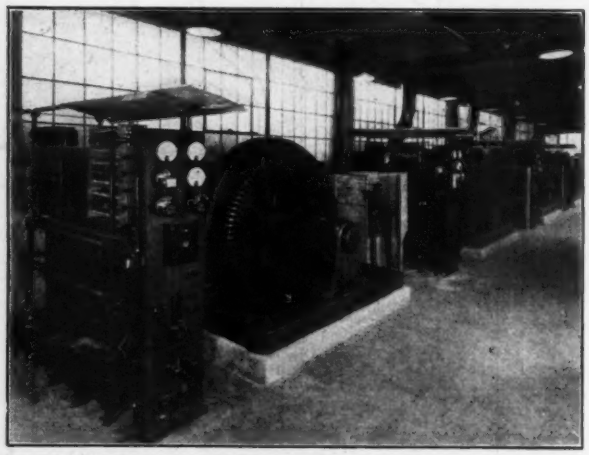
In the new Grays Harbor mill are installed the second largest digesters in the world, 19 feet 3 inches in diameter by 58 feet in height. This size is exceeded only by the size of the digesters at the mill of the Abitibi Power and Paper Company, Smooth Rock Fall, Ont. Exhaust fans remove gases from the operating floor. The blowpits are made of reinforced concrete and are rectangular in shape and are lined with a special tile.

There is little that is new or novel in the West Coast ground wood industry. Much of the ground wood production in several mills has been decreased. Of special interest, however, is the fact that one mill is weighing all of the wood delivered to each grinder.

The Columbia River Paper Mills are equipped with four pocket grinders made by the Sumner Iron Works and the most recent installation at the Longview Fibre Company is a battery of two

three pocket grinders made by the Sandy Hill Iron and Brass Works. These grinders will be driven by a 1650 horse power General Electric Company motor.

At the Hawley Pulp and Paper Company excellent technical control is applied to ground wood manufacture by R. J. Schadt, technical director. Five 1000 horse power, 2300 volt, 60 cycle, 3

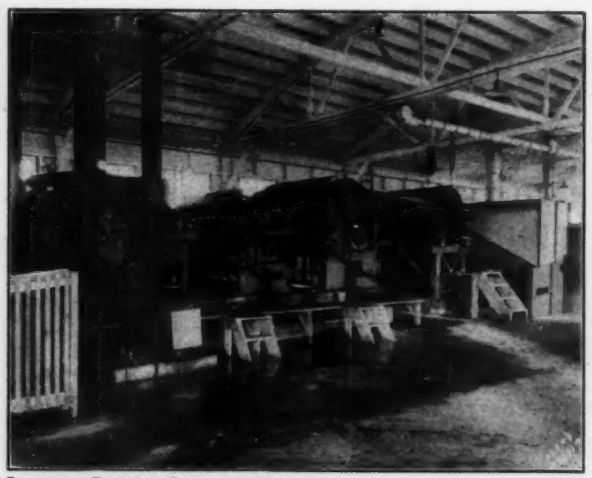


5—1000 HP., 2300 V., 60 CY., 3 PH., 240 R.P.M. SYNCHRONOUS MOTORS DRIVING ALLIS-CHALMERS MFG. CO. GRINDERS. HAWLEY PULP & PAPER CO., OREGON CITY, ORE.

phase, 240 r. p. m. Allis-Chalmers synchronous motors are used to drive the grinders.

Washing, Screening and Riffling

The importance of cleanliness in pulp has led the leading mills to install adequate riffling and screening systems. Most of the unclean pulp that has appeared on the market has been the product



Courtesy: Technical Economist Corp.

KAMYR PRESS SHOWING PULP SHEET ENTERING FIDALGO SHREDDER THEN TO FIDALGO DRYER. SHAFFER BOX CO., TACOMA, WASH.

of companies that have not appreciated the necessity for removing fine particles of barb, etc. In addition to the standard type of flat screens with which most pulp and paper makers are familiar it is interesting to note that the J. E. Berkheimer Company in Tacoma has installed new Glen Falls rolling action flat screens which embodies a new design of operating mechanism and is the logical development of the cam and roller principle.

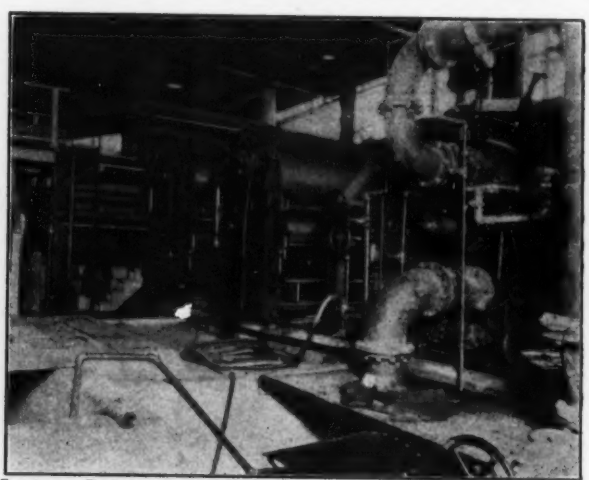
The effect of cooking is indicated by the percentage of screenings obtained. In some mills this is very large. Some mills are returning the screenings to the digesters but most of them are running them to the sewer. A small quantity of them are refined and used in wrapper stock. In the Hawley Pulp and Paper Company at Oregon City, Ore., a new type of refiner is being developed. This is a four compartment rod mill that refines sulphite screenings and makes a product that may be added to the pulp which in this particular mill is used for news print manufacture.

In the Shaffer mill stock flows by gravity to a supply tank from which it is pumped to Improved Machinery Company knotters having plates with quarter inch perforations. The stock then passes through rifflers on a mezzanine floor of the machine rooms to six lines of Smith and Valley flat screens and a .009 cut trailing screen. Each battery of screens is individually driven by means of a texrope drive from Fairbanks-Morse electric motors.

For washing the kraft pulp in the mill of the Union Bag plant two stages are used. In the first stage the washing of brown stock is done on three 6 feet by 10 feet Oliver vacuum filters. This removes most of the black liquor from the pulp. The remainder of the liquor is removed on the two second stage washers of the same type which are 8 feet by ten feet in size. The wash water on the second stage washers is white water from the wet machines.

Sandy Hill Iron and Brass Works flat screens are being used in the Grays Harbor Pulp and Paper Company mill at Hoquiam, Wash. These have embodied all the recent developments in screen manufacture. There are seven rows of screens, each row consisting of five 14 plate improved Packer type flat screens having continuous vats and cam shafts coupled together making a continuous shaft from end to end. Each row is driven separately by a worm gear reduction unit direct connected to a motor. The screens are equipped with Witham patent vat and fastener which makes possible the quick removal and replacement of screen plates. Steel spring boards make it possible to run the screens in either direction.

The installation of Dilts siphon washers at the Longview Fibre



Courtesy: Technical Economist Corp.

KAMYR PRESS, FIDALGO SHREDDER AND FEED END OF FIDALGO DRYER. UNION BAG & PAPER POWER CORP., TACOMA, WASH.

Company is an innovation. Filter disks are partly dipped in the stock in a beater and by means of siphon action the wash water is removed from the stock. The narrowness of the disk permits it to be submerged until it nearly touches the bottom of the beater thereby giving it an opportunity to clean the stock at the bottom as well as at the top of the beater. If desired multiple disks may be used thereby increasing the washing rate.

Of the new mills that have been built the description of the bleach plant of Grays Harbor Pulp and Paper mill may be used

to illustrate the process of bleaching sulphite used on the Pacific Coast.

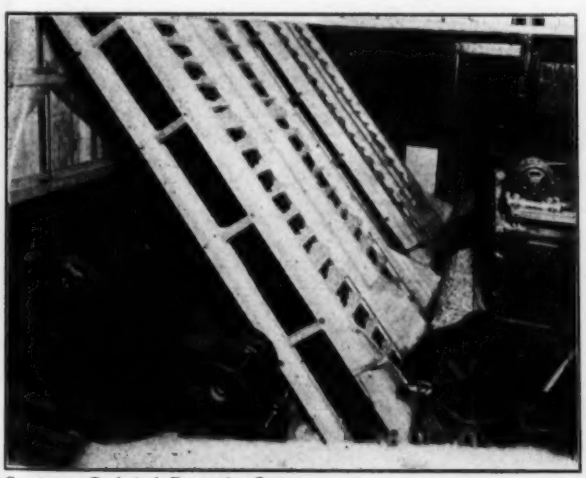
Two stage bleaching is used. Four vertical high density bleach vats are used in the first stage. Each bleach vat is direct driven by an electric motor. Stock at three per cent consistency is pumped from a chest to a flow box where it is diluted with white water to one per cent, after which it is thickened on Oliver filters (six feet diameter and ten foot face) and delivered by a screw conveyor to the first stage bleach vats. As the stock is run into the vat it is mixed with bleach liquor.

The pulp when ready is pumped to a flow box, diluted with white water and washed on Oliver bleach washers (eight feet diameter by ten foot face) when it is freed from soluble chlorides. The stock is then diluted and again thickened to 18 per cent on an Oliver filter and delivered to the second stage bleach vats of which there are six units. The stock is again diluted and washed with fresh water, the thickening and washing being repeated after which the stock is sent to the drying machine.

Pulp Machines

Two types of pulp drying machines are in evidence and may be illustrated by a brief description of the installations at Grays Harbor, Shafer Box mill and the mill of the Union Bag and Paper Power Company.

The Grays Harbor installation consists of a cylinder machine and a Black-Clawson vertical drier having 80 drying cylinders arranged five high. An interesting feature of this installation is that there is no drier pit and sufficient room is available for a man to walk under the driers. The machine is run by a Westinghouse sectional drive, the motors being located on a side balcony a broke beater is located under this balcony near the wet end of the machine. The pulp coming from the driers is cut into standard size sheets, piled on trucks which run on rails leading to two hydraulic presses. The pulp is compressed and made up into bales, each weighing about 450 pounds. The pulp bales are hauled by electric trucks from the balers to the storage room. One of these trucks is equipped with a small crane which makes it possible to pile the pulp in tiers with little effort.



Courtesy: Technical Economist Corp.

FIDALGO DRIED PULP LEAVING DRIER AND BEING CONVEYED TO HOPPER ABOVE BALE FORMER. UNION BAG & PAPER POWER CORP., TACOMA, WASH.

The Shaffer installation has a capacity of 50 tons per day of unbleached sulphite. The pulp being handled with a Kamyr press has its moisture content reduced to 50 per cent. It is then passed to a shredder and through a Fidalgo drier from which it emerges at 100 per cent air dry. The dried shredded pulp is then carried on a conveyor belt to a Hesse-Ersted baler where it is compressed to approximately 60 cubic feet per ton. It is then wrapped, strapped and weighed for shipment.

As the Tacoma mill of the Union Bag and Paper Power Company manufactures sulphate or kraft pulp rather than sulphite the method of drying will be described. The machine used is similar to that used at the Shaffer Box Company except that it is somewhat larger and handles 90 tons daily on each of two 120 inch Kamyr presses and Fidalgo driers. The cylinder mold of the Kamyr machine is equipped with a Nash vacuum pump which delivers pulp 28 per cent dry to the press part which in turn delivers it at 55 per cent to the shredders and from there to an eight section Sargent drier where it is dried to 100 per cent air dry by warm recirculated air. The pulp is then conveyed to large

Courtesy: Technical Economist Corp.

BALE BEING HYDRAULICALLY PRESSED FOR OCEAN SHIPMENT. UNION BAG & PAPER POWER CORP., TACOMA, WASH.

Courtesy: Technical Economist Corp.

UNWRAPPED BALES BEING WEIGHED PREVIOUS TO BEING PLACED IN PULP STORAGE. UNION BAG & PAPER POWER CORP., TACOMA, WASH.

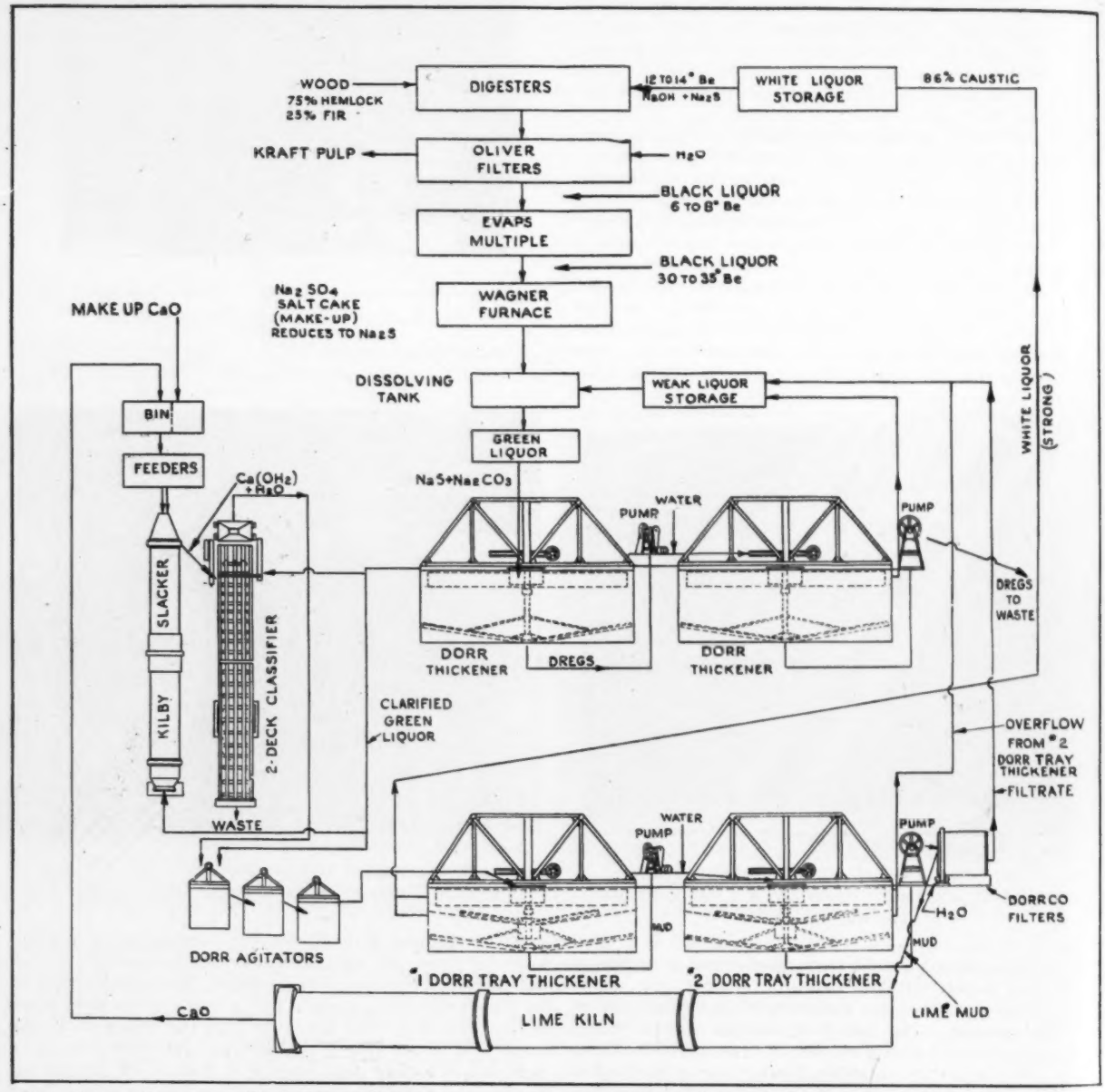
hoppers that are located over bale formers. The latter are of the Hesse-Ersted continuous type which produces bales having a capacity of 40 cubic feet per ton. The unwrapped bale is then placed in storage awaiting shipment.

Evaporation, Recovery and Causticizing

In the alkaline pulping processes the economy of operation depends largely on the efficiency of chemical recovery. A Peebles four effect evaporator is used at Longview Fibre Company and Swenson four effect evaporator at Union Bag. The latter has 28,800 square feet of total heating surface and a high pressure rapid circulating concentrator of 800 square feet heating surface and will evaporate the black liquor to about 35 degrees Baume-hot. The non condensible gases formed in the evaporator are passed to the Wagner furnace to be burned.

Still a third make of evaporator is used in the new kraft mill of the National Paper Products Company at Port Townsend, Wash. This is a Buflovak evaporator made by the Buffalo Foundry and Machine Company. The outstanding feature claimed for this evaporator is that entrainment losses are greatly reduced. It is a quadruple effect evaporator of the vertical rapid circulating type equipped with two inch tubes, twenty feet long and concentrates the black liquor from ten per cent to seventy per cent solids. Wash liquor is introduced into the second effect and is passed on to the third and fourth effects from which it is pumped to the first effect by a La Bour pump where it is concentrated to 50 per cent solids. It is then pumped to the concentrator where it is evaporated to 70 per cent solids. The concentrator operates under a steam pressure of 123 pounds gage and the vapor produced comes off at 30 pounds gage and is used to heat the liquor coming from the mill prior to its entry into the second effect.

Both the Longview Fibre Company and the Union Bag and Paper Power Company have adopted the stationary types of recovery furnaces instead of the old type of rotary furnaces of lower efficiency. The furnace at Longview is of local design



FLOW SHEET. CONTINUOUS GREEN LIQUOR CLARIFICATION AND CAUSTICIZING PLANT. UNION BAG & PAPER POWER CORP., TACOMA, WASH.

and that at Union Bag is the Wagner furnace supplied by the J. O. Ross Engineering Company.

Since the stationary furnace is now an evident success, it may be well to indicate some of its salient features. For many years the odor characteristic of kraft pulp mills has been considered to be a necessary evil and has forced companies to locate such mills away from population centers. The gases that have this undesirable odor are burned in the stationary furnace, thereby destroying the odor and enabling kraft pulp mills to be located in such centers of population as Tacoma.

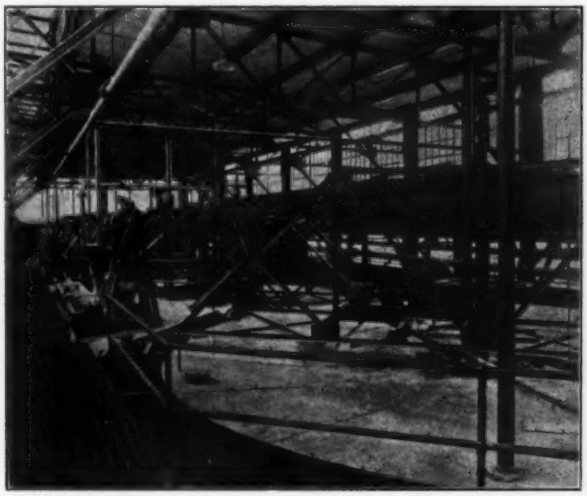
In addition to the odor removal it is possible to utilize the heat from the furnace to generate steam in waste heat boilers which meets a large part of the mill's demand for process steam. A large part of the chemicals ordinarily lost in sulphate recovery practice is being recovered at the two Pacific Coast mills using stationary recovery furnaces.

The two stationary furnace installations have been described in the trade journals. In brief it may be described as a vertical cylinder, formed of steel plates joined by cast iron shelves. Soapstone is used for the furnace lining and is set within the furnace in such a way as to allow for expansion and is separated from the shell by insulating material and an air space. A large three drum type, 500 horse power Erie City waste heat boiler is located above each furnace, and a dust trough in the bottom of the setting has the scrubber liquor returned through it and removes chemicals that accumulate.

A vertical steel tank called a scrubber is used for handling the gases coming from the furnace. The scrubber is equipped with spray nozzles and baffles so that good contact may be had between the dust particles and the water. The scrubber liquor is recirculated until it reaches a desired density whereupon it is sent to the black liquor tank.

The stationary furnace is first preheated and when at the proper temperature the liquor at a uniform high density is sprayed in near the top. The water content is first evaporated off and the combustible gases are burned in the presence of air which is admitted to the furnace. This air also assists in the removal of carbon and carbon monoxide. The sodium salts are present in the furnace in liquid form and are kept free from contact with air and are properly reduced for use again in liquor production.

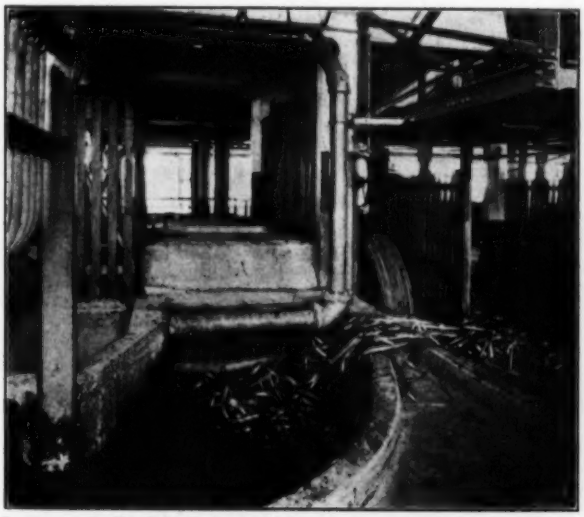
Causticising in the Union Bag mill is accomplished by means of a complete system installed by the Dorr Company. This consists of a continuous lime shaker, classifier, three Dorrco agitators, four classifiers and two Dorrco internal drum lime filters for washed lime mud. It is interesting to note that this is the initial installation of the Dorrco filter for preparing the lime for the rotary kilns.



Courtesy: Dorr Co.

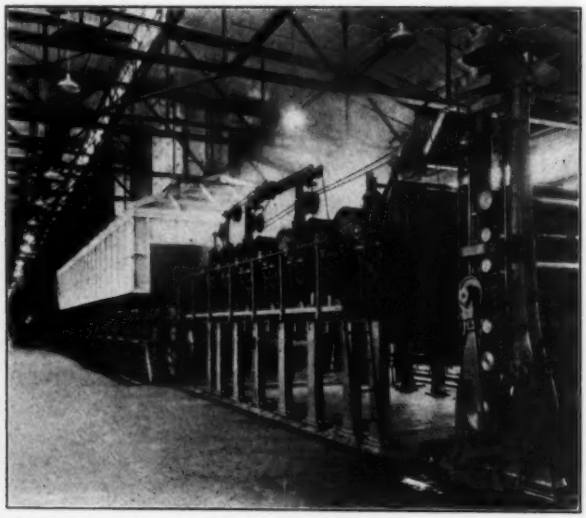
VIEW OF THE CAUSTICIZING ROOM AT THE UNION BAG & PAPER POWER MILL IN TACOMA, WASH.

A thirty foot Dorrco clarifier receives green liquor from the recovery room and delivers clear liquor to the causticizing system. The settled green liquor sludge is pumped to another thirty foot clarifier where it is washed with water and finally discharged to the sewer. Causticizing is carried on in Dorr agitators to which green liquor and caustic lime has been delivered. The causticized mixture is then sent to the clarifier from which the white liquor is delivered to storage tanks. The settled lime sludge is pumped to another lime clarifier where it is washed with water and then sent along to the lime sludge filters where



Courtesy: Pacific Pulp & Paper Industry.

SHARTLE BROS. BREAKER. NEW SULPHATE MILL OF THE LONGVIEW FIBRE CO., LONGVIEW, WASH.



Courtesy: Pacific Pulp & Paper Industry.

DRIER END OF BLACK-CLAWSON KRAFT BOARD MACHINE, LONGVIEW FIBRE CO., LONGVIEW, WASH.

it is prepared for the rotary kilns where it is burned and made suitable for further causticizing operations.

Stock Meters and Regulators

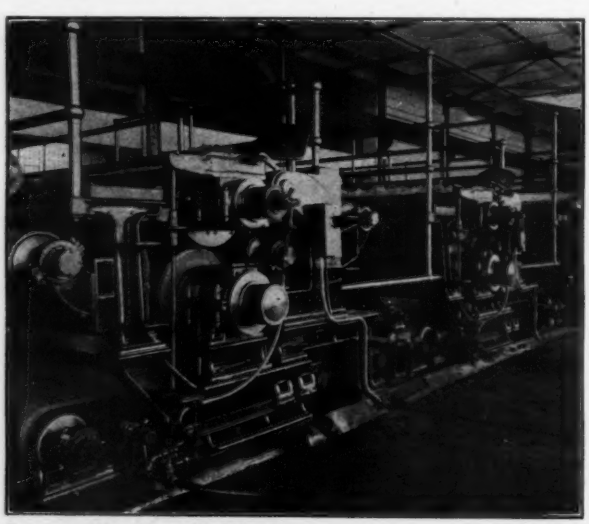
An endeavor is made to keep the stuff furnish delivered to the paper machines in as uniform manner as possible. In several mills including the Hawley Pulp & Paper Company and Washington Pulp & Paper Company at Port Angeles, Wash., Trimbey proportioning and systems are installed. A large number of mills are equipped with consistency regulators of the Trimbey Bovin or Warner Equalizer types. hTe latter is a regulator used only on the Pacific coast, particularly in the Crown-Zeller- is pumped from the pulp storage tanks to large storage tanks in the paper mill. From here it is pumped by Beloit triplex pumps to the beater room where it is diluted and then thickened back mills.

Paper Making Machinery

The only paper mill to be built during the past year having special features of interest is the Grays Harbor Pulp and Paper Company mill at Hoquiam, Wash. The pulp for the paper mill to eight per cent consistency in Improved Paper Machinery Company thickeners.

The stock is dumped from the thickeners into a trough equipped with a screw conveyor. The trough extends along the length of the beater room. Four beaters arelocated on each side of the room and pulp is run into them from the trough through copper pipes.

The beaters were made by E. D. Jones & Sons, and are of special design to provide for rapid circulation of stock at eight per cent consistency. The beater trough is made of concrete, lined with white porcelain tile. All the metal parts that come into contact with the stock are made fo copper, brass or bronze to prevent corrosion. 200 horse power Allis-Chalmers motors drive each set of two beaters. Each pair of beaters have size

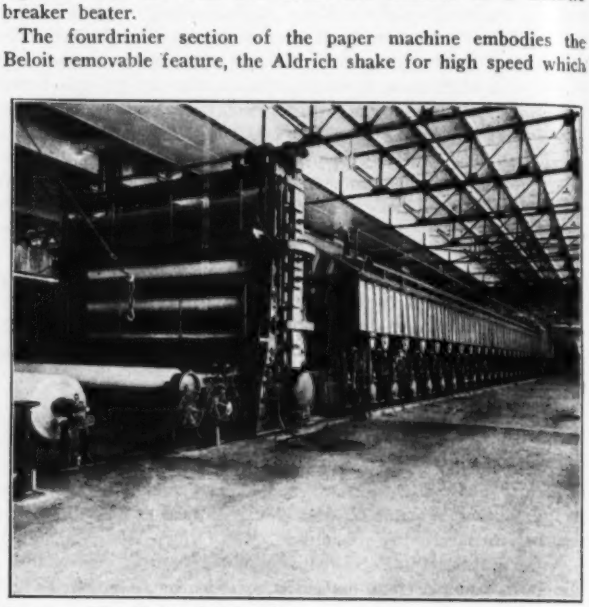


Courtesy: Rice, Barton & Fales, Inc.

VIEW SHOWING THE PRESS PART OF MACHINE, WASHINGTON PULP & PAPER CO., PORT ANGELES, WASH.

and alum tanks, located above them. The stock is dumped from the beaters into tile lined chests and from there pumped by Beloit triplex pumps to two E. D. Jones, Majestic jordans which are specially designed for this mill, and from thence to the machine chests. An Allis-Chalmers centrifugal pump delivers the stuff to three Bird Screens on the paper machine which like many other machines on the Coast has a Beloit removable Fourdrinier. The dry end of this machine was made by Bagley & Sewall. An Oliver save-all handles the white water from the machine. The drive is of the sectional type furnished by Westinghouse and the trim and broke are handled in a Shartle breaker beater.

The fourdrinier section of the paper machine embodies the Beloit removable feature, the Aldrich shake for high speed which



Courtesy: Rice, Barton & Fales, Inc.

THE DRY END OF THE NEWS PRINT MACHINE, WASHINGTON PULP & PAPER CO., PORT ANGELES, WASH.

is adjustable both as regards stroke and speed. The Fourdrinier is adjustable and arranged to vary the pitch of the wire by means of a motor which the machine is in operation. The position of the head box and the breast roll remains permanent. The breast roll is of the Beloit patented type, built light and stiff and mounted in Timken bearings as are also the table rolls. The table rolls and bearings are mounted above the shake rails to enable the operator to watch the sheet formation on the wire. The suction boxes are lighter than usual and are equipped with a patented hydraulic oscillating device which keeps them moving under the wire, thereby preventing grooving by the wire and easier wire guiding. The Beloit suction roll has a cantilever arrangement which allows the front end to be suspended in the air when changing a wire. The wire is not touched by hand when being placed on the machine.

The press part, drier, calender and winder section is a product of the Bagley & Sewall Company. Some of its special features include small, silent inclosed gears, use of anti-friction bearings throughout and full rolling contact of carefully balanced drier rolls. The press part consists of three regular presses but the first press frame is so designed that a 30 inch suction roll may later replace the roll being used without altering the frame. The first and second presses operate direct but the third press reverses. The paper is carried automatically from the second press through the third press to the smoothing press. All the top press rolls which are made of granite are equipped with bronze blade, vibrating type doctors. There are automatic broke conveyors for the first and second presses as well as a save-all for each press.

The felt rolls are made of steel pipe covered with hard rubber. The felts are 60 feet long. A smoothing press supplied with a rubber covered upper roll and gun metal lower roll is used instead of a baby drier. The lower roll is fitted with an oscillating doctor with hard rubber blade to lead the paper into the driers.

An interesting Bagley & Sewall development in the drier section enables the back side of the machine to be nearly as open

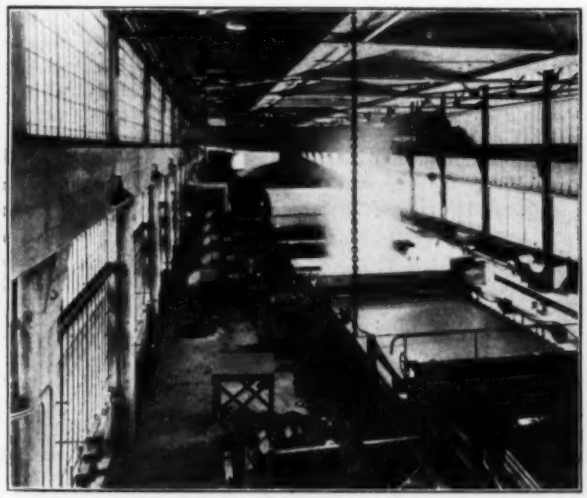
as the front. The gears are small and completely enclosed. There are 40 driers, each 60 inches in diameter with 200 inch face. The operation is unusually quiet. Another important feature of the drier section is a patented steam joint in which roller bearings support the weight and also take the end thrust due to steam pressure. The steam joints carry an adjustable siphon pipe which is adjustable from the outside. There are two bronze cooling rolls, which may be water cooled, located after the last top driers. The calender stack is equipped with a small motor driven oil pump of high pressure capacity. This pump is operated for a few minutes before starting the calender stack and relieves the pressure on the rolls from the bottom bearing and furnishes lubrication. The drier is of the Westinghouse sectionalized type.

Port Angeles Machine

One of the most recent news machines is that installed at the Washington Pulp and Paper Company's mill at Port Angeles, Wash. This is a Rice, Barton & Fales machine, 234 inches wide, equipped with a removable fourdrinier, suction couch roll, three presses, 48 driers, 60 inches in diameter, ten roll calender stack, Pope reel and a Rice, Barton slitter and two drum winder. It has been running at about 1075 feet per minute. All the smaller rolls, such as the wire rolls, table rolls and felt rolls are equipped with anti-friction bearings; the drier part is equipped with babbitted bearings with an oiling system which supplies oil and conducts it back to an oil filter.

Electric Developments on Paper Machines

In considering paper machine developments, it is interesting to observe the contributions that have been made by the large electrical machinery companies. The Westinghouse Electric and Manufacturing Company has recently brought out the following (1) the starting generator system for the sectional machine drive, (2) the carbon pile type of voltage regulators and section speed regulators, (3) the wet end drive for cylinder paper machines and (4) the multiple motor winder drive. The starting generator



View of Paper Machine Showing the Westinghouse Sectionalized Drive, Grays Harbor Pulp & Paper Co., Hoquiam, Wash.

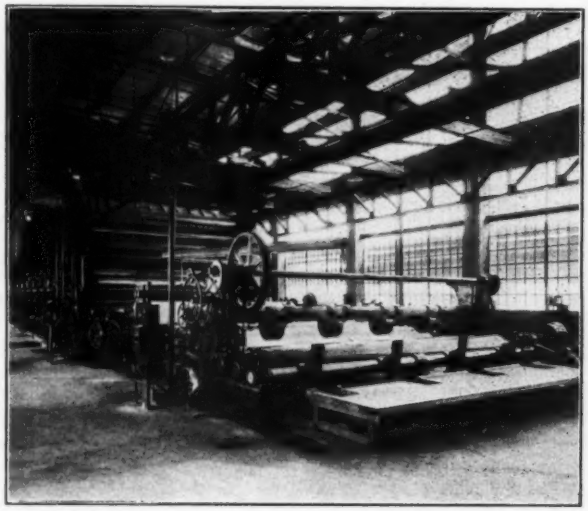
system is employed on the following machines on the Pacific coast.

(1) Washington Pulp & Paper Company, Port Angeles, Wash., on a 234 inch Rice, Barton & Fales news machine designed to run at 1500 feet per minute.

(2) Hawley Pulp and Paper Company, Oregon City, Ore., on a 234 inch Beloit news machine at 1500 feet per minute.

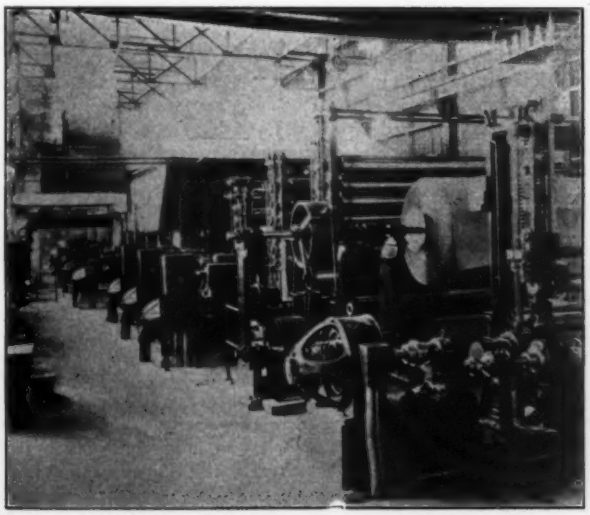
(3) Columbia River Paper Mills, Vancouver, Wash., on a 136 inch Bagley & Sewall fourdrinier specialty machine with pick up felts designed for a speed range of 300 to 1000 feet per minute.

(4) Rainier Pulp & Paper Company, Shelton, Wash., on a 128 inch Black-Clawson cylinder pulp machine designed for a speed range of 75 to 275 feet per minute.



Dry End of Paper Machine, Grays Harbor Pulp & Paper Co., Hoquiam, Wash.

(5) Grays Harbor Pulp and Paper Company, Hoquiam, Wash., on a 130 inch Black-Clawson cylinder pulp machine designed for a speed range of 250 to 750 feet per minute.



Courtesy: Westinghouse Elec. & Mfg. Co.
Sectional Drive of Paper Machine, National Paper Products Co., Port Townsend, Wash.

(6) National Paper Products Company, Port Townsend, Wash., on a 248 inch Bagley & Sewall fourdrinier kraft machine with speed range of 300 to 1050 feet per minute.

(7) Grays Harbor Pulp and Paper Company, Hoquiam, Wash., on a 202 inch Bagley & Sewall fourdrinier bond machine with a speed range of 250 to 1000 feet per minute.

The starting generator system eliminates all starting resistance grids, removes the starting and inching load from the main gener-

ator, makes starting and inching positive regardless of the main generator voltage or paper speed.

The carbon pile type voltage regulator is used for regulating the voltage of the main generator and constant voltage exciter in connection with each of aforementioned paper machine drives, as well as several other machines with sectional drive in the same locality.

The carbon pile type section speed regulator which has recently been developed by Westinghouse is to be found in operation in connection with the 234 inch high speed news machine of the Washington Pulp and Paper Company, at Port Angeles, Wash., controlling the speed of the drying sections. This regulator is an important development relative to the sectional paper machine drive. It is a quick response and high speed regulator with excellent anti-hunting features, providing stability and speed in operation. It is simple and easily maintained.

The wet end drive for cylinder machines is a recent development for this type of machine and includes in addition to the individual motor drive for all the main sections of the machine, individual motors for each cylinder mold and each primary and baby press section. This increases the life of the felts by removing the strain and pull from these felts. The only complete installation of this kind that has been made is the sectional drive on a 130 inch Black-Clawson cylinder board machine in the mill of the National Paper Products Company at Port Townsend. This machine has a speed range of 75 to 300 feet per minute.

The multiple winder drive eliminates the counter shaft, cone pulleys, belts and frequently the gear shift and does much to prepare a uniform hard roll. Provision is also made for a braking generator and automatic tension regulator which does away with mechanical and friction brakes.

Organization of Technical Men

The current year has seen the formation of a Pacific coast section of the Technical Association of the Pulp and Paper Industry. Beginning with an informal conference in 1928 at the University of Washington, the technical men particularly of Oregon, Washington and British Columbia, have expressed an interest in getting together from time to discuss problems of common interest. In June of this year the section of TAPPI was organized with C. R. P. Cash, pulp mill superintendent of the Cascade Paper Company, West Tacoma, Wash., as its first chairman. The first fall meeting was held in Tacoma this month at which time R. S. Wertheimer, general manager of the Longview Fibre Company, Longview, Wash., was elected chairman.

Gratifying Support

It is gratifying to note that company executives and superintendents as well as engineers and chemists are enthusiastic supports of the section, thereby indicating their appreciation of the part played by engineering and technical control in the industry. There are comparatively few operating men of the so called old school in the Pacific coast mills and consequentiy precedence and custom do not play an important part in plant operations. It is gratifying to note that the managers of many of the mills believe in using the conference system of management whereby frequent meetings are held. Sometimes these are held daily, in the manager's office wherein every foreman and the supervisory technical men discuss mill problems. In this way every foreman, etc., is kept acquainted with every phase of the mill operation and realizes that he is expected to maintain the highest efficiency possible in his department and to be alert to improvements. Realizing that even a mill conference has a tendency to make the group somewhat self centered the local mill management appreciates the value of getting out occasionally and mingling with large groups of technical men to exchange ideas that will be of mutual benefit. No one realizes more than the man on the job, whatever that job may be that no individual or group has a monopoly on ideas or information. It is very evident that the TAPPI section will grow rapidly and will help the industry do more for itself than any other agency.

Progressive Spirit

This article has been written to show the progressive spirit that prevails in the pulp and paper companies on the Pacific coast. In practically every new mill the very latest developments have been accepted and applied. Although the mill operators have been confronted with many new and local problems they find that the large machinery and equipment companies have been able to meet the new situations and have assisted greatly in the development work.

Impressive Improvements

The writer visited the west coast in June and was impressed with the extent to which improvements in manufacturing methods have been adopted. There have been other developments in individual mills for which publicity cannot yet be given but most of the west coast companies have proven to be generous in their willingness to impart information for the good of the industry. The writer wishes to thank the many individuals and companies who assisted him in the preparation of this article.

New Greenville Insulating Board Plant Completed

Production and distribution of Weatherwood, the new insulating material of the Chicago Mill and Lumber Corporation, will begin about November 1, in the new plant at Greenville, Miss., according to the announcement of Walter P. Paepcke, president.

The Greenville plant, built at a cost of $1,000,000, will employ at least 125 men at the start. Plans call for an output of 250,000 square feet daily and it is expected the yearly business will amount to more than $2,000,000.

Weatherwood is claimed by the company to be the only insulating board fabricated from hard wood. An almost inexhaustible supply of this material is available in the timber tracts owned by the Chicago Mill and Lumber Corporation in Mississippi, Arkansas, Louisiana and North Carolina.

The new board is one-half inch thick, four feet wide and varying lengths and is distributed in lengths according to the uses to which it is to be put. It is of high structural strength. Each piece will be stamped with the Weatherwood trade mark, a weathercock. This has an exclusive tongue and groove joint that possesses unusual strength and efficiency.

Great heat insulating and sound deadening qualities are claimed for the product and it may be stained or painted for interior and exterior use. As an insulating medium, it is expected to find use in homes, refrigerator cars, ice boxes, cold storage plants, etc. Its sound deadening properties make it available for radio cabinets, offices, schools, hotels, hospitals and many other places. Exhaustive tests made under varying conditions show that Weatherwood possesses unusual values in efficiency.

Manufacturing processes consist of chipping southern hardwood into small pieces which are reduced to a pulp through chemicals and water. The pulp is poured on to a revolving cylindrical screen which removes most of the water, the rest being taken out by a gas drier after the mass has passed through the forming machines.

The product will be sold direct to retail building supply and lumber dealers throughout the world, the potential market being seemingly without limitation.

The Chicago Mill and Lumber Corporation has been known in the trade for nearly fifty years as producer and distributor of fine lumber products. Its financial resources are strong and it owns a vast acreage of southern hardwood strategically located for economical and quick distribution. With its associated companies it does a yearly business of more than $30,000,000. Last year more than 57,000 freight cars were utilized to fill transportation requirements.

New Board Plants to Utilize Chestnut Chips

Mead Paper Board Corp., of Dayton, Ohio, Has Established Mills at Knoxville, Sylva and Harriman, to Manufacture Chestnut Corrugated Board—Lynchburg, Va., Plant, Where Operations Have Just Started, Has Capacity of 125 Tons of Liner Board Daily

Mead Paper Board Corporation, which has been recently organized, and which has its principal office at Dayton, Ohio, is engaged in the manufacture of corrugating board and liner from chestnut.

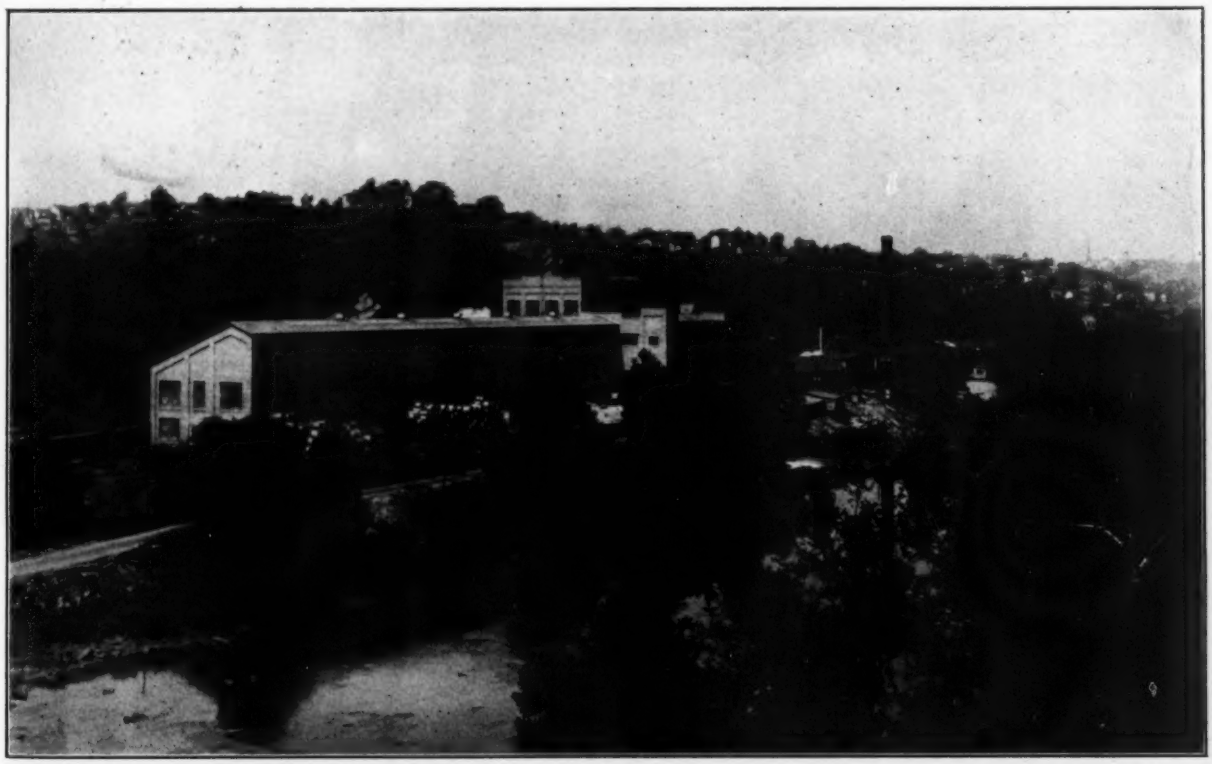
Some years ago the Mead Fiber Company, of Kingsport, Tenn., conducted extended investigations and research in an attempt to utilize in the manufacture of pulp, the leached chestnut chips which result from the operations of tanning extract plants. This line of development was subsequently conducted by the Southern Extract Company, of Knoxville, Tenn., which was associated with the Mead Fiber Company. At this time it was not only desirable to utilize these leached chestnut chips, because of the economic waste due to the fact that such chips, under the processes then in use, could be utilized only for fuel; but in addition the chestnut blight had make tremendous inroads, and the chestnut forests were being rapidly and widely affected. As a result this great natural resource seemed destined to early destruction, without any means of practical utilization for the benefit of the public.

The Semi Chemical Method

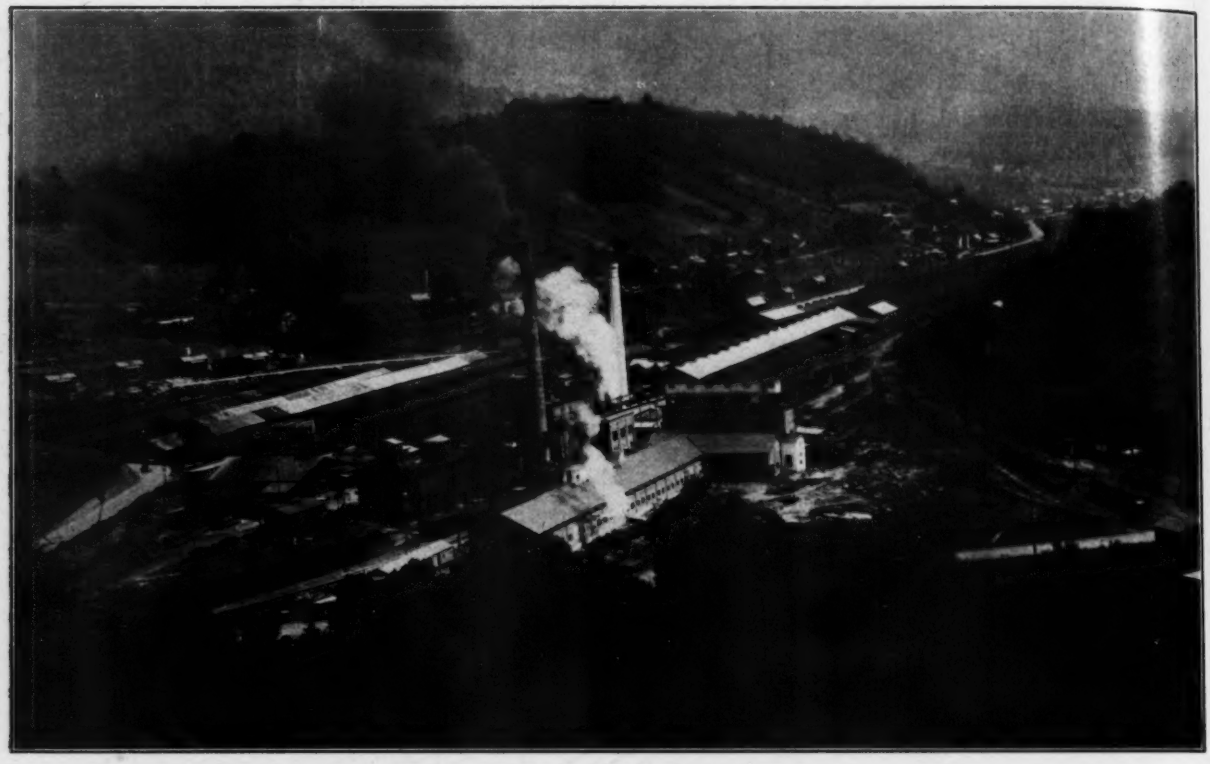
The Southern Extract Company, therefore, had joined with the Forest Products Laboratory, of the Department of Agriculture, in an endeavor to develop processes and machinery for satisfactorily utilizing chestnut while it is still available. Their joint efforts resulted in the development of certain processes for the treatment of the leached chestnut chips, now known as the "semi-chemical" method; and of mechanical treatment of the chips after they have been subjected to this semi-chemical cook, utilizing a rod-mill. In this semi-chemical cook the chips are not reduced to pulp, but are so treated that when subjected to subsequent mechanical disintegration in the rod-mill, the pulping operation is carried on, and the resulting pulp makes a superior sheet for the manufacture of corrugating board,—such corrugating board imparting greater strength and rigidity to the cartons.

Processes Commercially Adapted

The process having been commercially adapted by the Southern Extract Company, and proved satisfactory, the Mead Paper Board Corporation was organized to expand the operations as rapidly as feasible to properly enlarge the utilization of the rapidly disappearing chestnut. In the commercial development it was discovered that a control of a closely available supply of chestnut chips is necessary, and that the leaching and the subsequent pulping and paper making operations must be adequately coordinated, in order that practicable operations may be carried on. As a result Mead Paper Board Corporation has established plants in various localities, adjacent to suitable sources of supply of raw material, and has necessarily combined its pulping and

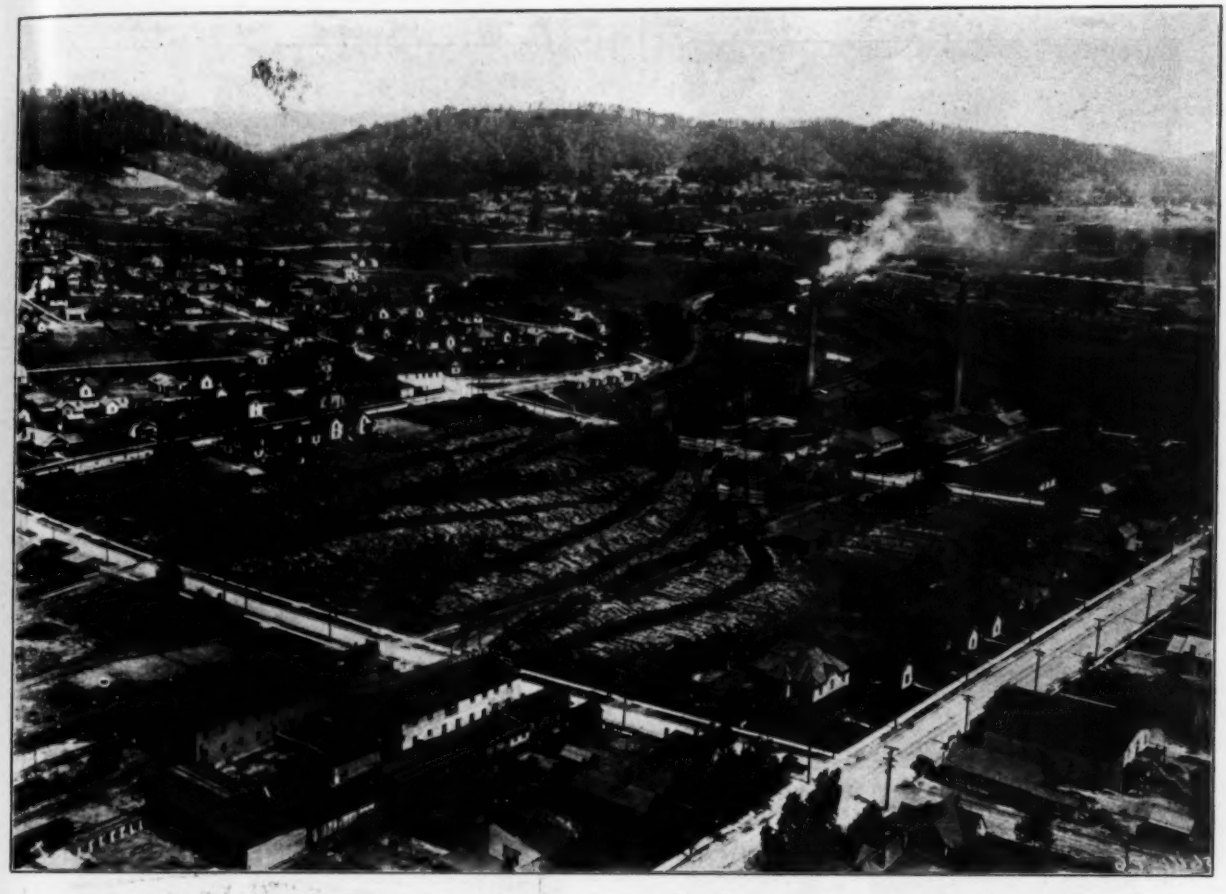


PLANT OF THE JNO. HEALD CO., LYNCHBURG, VA.



PLANT OF THE SYLVA PAPERBOARD CO., SYLVA, N. C.

PLANT OF THE HARRIMAN CO., HARRIMAN, TENN.



PLANT OF THE SOUTHERN EXTRACT CO., KNOXVILLE, TENN.

paper making operations with the extraction of tanning extract, which is a necessary by-product in the operations.

Southern Extract Plant

The Southern Extract Company plant was the first of these plant locations, a pulp and board mill being erected to utilize the chips resulting from the tanning extract plant. This mill, located at Knoxville, Tenn., has four rotary digesters, four rod mills, and a cylinder paper machine trimming 108 inches. It has a capacity of fifty tons of .009 chestnut corrugating board per day.

Sylva Paperboard Co.

The second plant is that of Sylva Paperboard Company, an operating subsidiary of Mead Paper Board Corporation. It has five rotary digesters, five rod mills, and a cylinder paper machine trimming 132 inches. It has a capacity of sixty-five tons of .009 chestnut corrugating board per day.

Knoxville and Sylva Plants

The Knoxville and Sylva plants having been placed on a commercial basis, a third plant was established at Harriman, Tenn., this subsidiary company being known as the Harriman Company. It has recently gone into operation. Its equipment is similar to that of Sylva except that the board machine trims 138 inches, and its capacity is about seventy tons per day. It is also manufacturing .009 chestnut corrugating board.

The Lynchburg Plant

The Lynchburg, Va., plant known as the Jno. Heald Company which has just started operation has been installed for the manufacture of liner, and also utilizes chestnut chips. This mill contains five rotary digesters, six 2,000 pound beaters, and a six cylinder board machine trimming 138 inches. Its capacity is 125 tons of .016 liner board per day.

Shawinigan Begins Work on Huge Dam

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., October 26, 1929.—Excavations for a huge dam at the Toro rapids, near St. Michel des Saints, Que., will soon be commenced by the Shawinigan Engineering Company, a subsidiary of the Shawinigan Water and Power Company, which supplies power to most of the pulp and paper mills in the Three Rivers district. The Toro Rapids are on the Mattawin River, a tributary of the St. Maurice River, about 26 miles below Saint Michel, and about 120 miles north of Montreal. The object of building the dam is to regulate the water so that a greater minimum flow may be made available for the power works farther down. At present when water becomes low it takes two weeks for extra water released from the big Gouin dam at the head of the St. Maurice River to reach the Shawinigan power plant at Grand Mere, and meanwhile rains may have made that water unnecessary. The proposed new dam will make extra water immediately available.

The dam itself will be about 2,400 feet long—approximately half a mile—and will include an earth section 1,830 feet in length, having reinforced concrete walls at the channel, and a concrete section will include regulating sluices, discharge sluices, and a small hydro-electric unit for the operation of the dam. The project is estimated to cost $2,300,000.

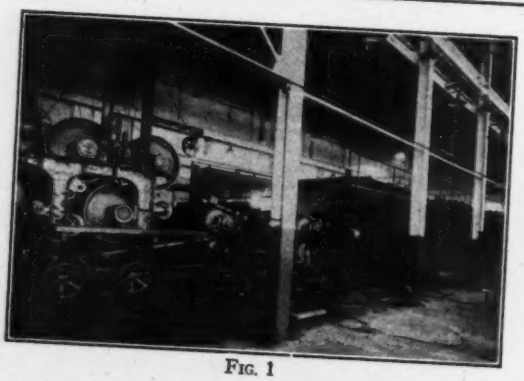


FIG. 1

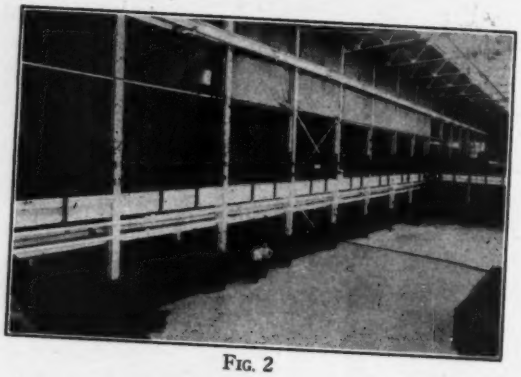


FIG. 2

FIG. 3

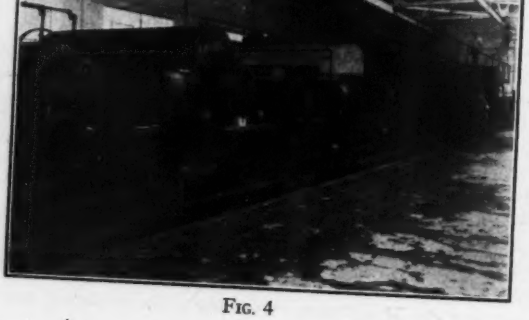


FIG. 4

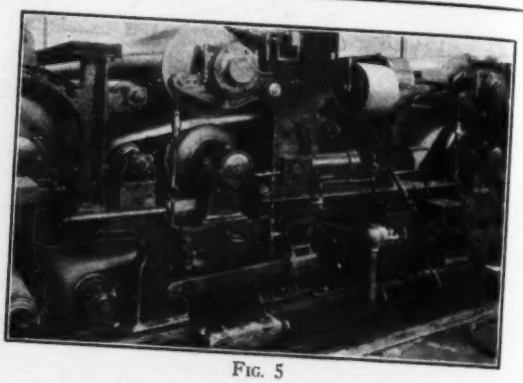


FIG. 5

FIG. 6

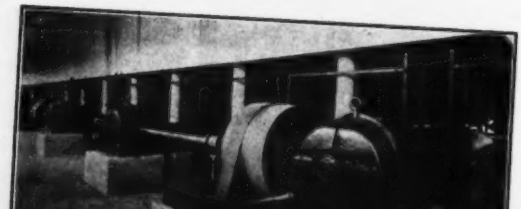


FIG. 7

FIG. 8

Paper Making Machine Installations

Some Representative Paper Making Machine Builders Report Their Installations During the Past Year and Some of the Fourdriniers and Cylinder Machines on Order for Early Delivery for the Annual Mill Number of the Paper Trade Journal

Some of the representative paper making machinery have reported their installations during the past year for the Manufacturers Number of the PAPER TRADE JOURNAL as follows:

The Black-Clawson Co.

Within the last year the Black-Clawson Company, of Hamilton, Ohio, has placed in operation two large Cylinder machines, one of these at the West Virginia Pulp and Paper Company, at Covington, Va. This is a seven Cylinder machine with 136 inch face of mold with a thoroughly modern wet end and including Timken bearings throughout, hydraulic presses, pre-driers and other features which are exclusive on this machine.

In the photographs on the opposite page Fig. 1 shows a view of the wet end looking toward the vats. Fig. 2 shows a view of the complete machine and a close-up of the drier section which is, of course, vertical and starting from the basement floor. Fig. 3 gives a view of the spiral bevel gear drives which are used throughout on the machine. This machine is operating on kraft liners.

At Lynchburg, Va., the company installed another new machine constructed for the Jno. H. Heald Company with cylinders 152-inch face. This also is a seven Cylinder machine with Timken roller bearings throughout on the wet end with hydraulic presses, automatic broke conveyor, pre-driers, etc. Fig. 4 shows a view of the wet end on this machine and Fig. 5 a close-up view of one of the presses showing special Black-Clawson features. The drier section on this machine also is arranged vertically and Fig. 6 shows a view of the sheet going into the drier section. In this case the drier frames also are supported on the basement floor. On the drier section all gears are Maag machine cut and the bearings of special type ring oiling lubricated by a continuous oiling system. The drives on this machine also are spiral bevel gear as shown in part in Fig. 7.

In addition to these new machines the company has built many other parts of installations consisting principally of the new wet ends equipped with Timken bearings and new vertical drier sections.

At the Celotex Company, New Orleans, La., the company was asked to design a press part for their new machine capable of unusual pressures. Using the hydraulic principle the company has designed presses capable of 100 tons on each journal which gives them absolute control of pressure on their sheet. The latest reports from the plant indicate that they are well pleased with the results that have been obtainable. Fig. 8 gives a rather clear idea of one section of this press.

Bagley & Sewall Co.

The Bagley & Sewall Company, of Watertown, N. Y., has built and installed the following machinery since November 1 of last year:

One 304 inch news machine for the Great Lakes Pulp and Paper Company, Fort William, Ont. This machine is designed for a maximum speed of 1200 feet per minute, and is driven by a General Electric Sectional Electric Drive. Machine started up in May, 1929.

One 202 inch book machine for the Grays Harbor Pulp and Paper Company, Hoquiam, Wash. This machine is designed for a maximum speed of 800 feet per minute and is driven by a Westinghouse Sectional Electric Drive. Machine started in June, 1929.

One 250 inch kraft machine for the National Paper Products Company, Port Townsend, Wash. The machine is designed for a maximum speed of 1000 feet per minute, and is driven by a Westinghouse Sectional Electric Drive. Machine started August, 1929.

One 176 inch tissue machine for Moyer & Pratt, Lyonsdale, N. Y. The machine is designed for a maximum speed of 600 feet per minute, and is driven by the Bagley & Sewall inclosed type spiral bevel gear drive.

The Pusey & Jones Corp.

The Pusey & Jones Corporation, of Wilmington, Del., has built and installed the following machines since November 1, 1928:

MACHINES INSTALLED

Fraser Paper, Limited, Madawaska, Me.—One 226 inch Fourdrinier machine with removable Fourdrinier for the manufacture of light-weight catalog paper. Commenced operation November, 1928.

A. P. W. Paper Company, Albany, N. Y.—One 178 inch Fourdrinier machine with removable Fourdrinier for the manufacture of tissue and creped papers. Commenced operation January, 1929.

Fraser Paper, Limited, Madawaska, Me.—One 148 inch seven Cylinder Board Machine for the manufacture of sulphite and ground wood board. Commenced operation January, 1929.

The Brown Company, Berlin, N. H.—One 44 inch combined single Cylinder and Fourdrinier experimental machine. This machine also is equipped with a five-foot diameter Yankee Drier. Commenced operation March, 1929.

Mead Pulp and Paper Company, Chillicothe, Ohio—One 160 inch book paper machine. This is the fourth machine built for this company. Commenced operation April, 1929.

MACHINES ON ORDER

Brown Paper Mill Company, Inc., Monroe, La.—One 178 inch kraft paper machine with removable Fourdrinier. This will be the third machine furnished this company. Will commence operation about May, 1930.

Fraser Paper, Limited, Madawaska, Me.—One 226 inch machine with removable Fourdrinier for manufacture of light weight catalog papers. When this machine is in operation the mill will have seven machines all built by the Pusey & Jones Corp. Will commence operation the latter part of this year.

Union Company, Oslo, Norway—One 156 inch high-speed news print machine will be shipped from here on or about February 1st.

Brown Paper Mill Company, Monroe, La.—One 178 inch 5-Cylinder board machine for production of kraft liner. This machine will have 60 inch diameter cylinder moulds and it is larger than any machine now in operation. Will commence operation about June, 1930.

Rice, Barton & Fales

Rice, Barton & Fales, of Worcester, Mass., have installed during the past year or have on order the following machines:

A 6-Cylinder board machine for Warren Manufacturing Company—started about the middle of the year.

A 92 inch Fourdrinier machine for making condensate papers, which will probably be started the last of this month or the first of next.

A 124 inch Fourdrinier book machine which will probably be started in November.

A 105 inch 6-Cylinder machine which will be started about the first of next year.

Smith & Winchester Mfg. Co.

The Smith & Winchester Manufacturing Company, of South Windham, Conn., has built three Fourdrinier machines of special

design with anti-friction bearings on the wet end and spiral bevel gear drives. These machines were specially built and designed for a manufacturer of condenser paper and have all been started within the last three months.

Glens Falls Machine Works

The Glens Falls Machine Works, Glens Falls, N. Y., has installed the following wet machines during the year:

International Paper Company of Alabama, Mobile, Ala.—72 inch machine.

Cornstalk Products Company, Danville, Ill.—96 inch machine.

Sylva Paper Board Company, Sylva, N. C.—96 inch machine.

Southern Extract Company, Knoxville, Tenn.—96 inch machine.

Calcasieu Sulphate Company, Elizabeth, La.—84 inch machine. This machine is now in process and has not yet been installed.

Willapa Pulp & Paper Building Modern Plant

The Willapa Pulp and Paper Mills are building a modern sulphate pulp mill, which will have a capacity of approximately 30,000 tons of high grade sulphate pulp per annum. The site of the mill is on Willapa Harbor, about fourteen miles from the ocean, and any freighter plying on the Pacific Ocean can reach the plant under its own steam, without a pilot, at any time, day or night, within approximately an hour after entering the harbor.

The site comprises 64 acres, having a deep water frontage of 4000 lineal feet, of which 3000 lineal feet is booming grounds for logs, and will hold 12,000,000 feet of logs at one time. Seven hundred feet of this water frontage is the face of the docks, comprising about five acres, capable of holding 6,000,000 feet of sawed lumber. The site is located between the two towns of South Bend and Raymond, Wash., which are about three miles apart. The Northern Pacific has two spur tracks into the property; the Milwaukee has grid facilities for loading. A paved highway passes the plant, connecting the two towns, as also does an electric street railway, thus giving excellent facilities for labor to reach the plant.

At the present time the property includes a complete cut up mill, with steam plant, warehouse buildings, etc., sufficient to produce 100,000 feet of sawed pulp wood or lumber per eight hours. There are two sources of pure sweet water that is drinkable, both of which are less than a mile from the plant, which will produce water sufficient for a 200-ton mill. Water can also be obtained from the cities of South Bend or Raymond, at a cost not to exceed $20.00 per million gallons.

Vast Timber Resources

Pacific County covers an area about forty miles from North to South, and thirty miles from East to West, within the borders of which there is over 17,000,000,000 feet of timber suitable for pulp. Within a radius of fifteen miles of the plant, there is sufficient timber to operate the plant for fifty years. There is approximately 300 miles of water frontage on the harbor and rivers, which is nearly all lined with timber. This timber can be put into the water and transported to the mill at a very low cost. Because of the mild climate, which rarely goes below freezing, and the excessive rainfall on an average of 100 inches per year, the forests regrow to a suitable size for pulp in a period of 25 to 30 years.

The Willapa Pulp and Paper Mills own, and have paid for, approximately 65,000,000 feet of timber, which is all very acceptable, being adjacent to water transportation. The company also owns the only commercial deposit of lime rock in south west Washington, which is on the tide water and is very high grade, because it is a sea fossil deposit. There are several million tons of this lime rock.

The company has contracts with two major milling and logging operators who have an expectancy of operation approximating twenty years, that it is to have at its option any and all hemlock and spruce logs, at the market price on the harbor, and any of the waste from the mill that it desires to take, during the entire life of the operation.

Inasmuch as the plant is located between the two cities, one having a population of about 1500, the other a population of about 4000, there is an ample supply of labor, at a wage corresponding to the wages paid in the saw mills of that territory, which at this time is about 45 cents per hour. Also, because of the mild climate, labor will produce more in the same number of hours during the entire year.

There is ample electric power for the needs of the mill at the present time, same being furnished by the Willapa Electric Company, owned by Sanderson and Porter interests of New York City. They are now developing a hydro electric project to produce approximately 20,000 h.p. of electric energy.

Contains Latest Features

The pulp mill is to be a modern up to date plant containing all the latest features including lime recovery plant, and a cylinder drying machine. There will be three welded steel digesters 8 feet by 34 feet together with complete washing system, continuous causticizing system, and the latest evaporator and furnace equipment.

The wood room for manufacturing chips will be the last word in efficiency and construction. The buildings are to be fire proof, foundations and floors to be of reinforced cement; the frame to be structural steel; and the walls to be hard burned hollow tile, and blazed steel window sash; and roofs of non-inflammable material.

The digester building, including the wash room and drying rooms, will be 38 feet wide by 325 feet long; the acid plant and recovery room is to be 120 feet by 150 feet; the lime recovery plant will be 20 feet by 150 feet. Piling has been driven to bed rock, and the buildings will rest on this foundation.

L. A. DeGuere, of Wisconsin Rapids, is the designing and construction engineer, and has provided as efficient and economical a plant as it is possible to build. There are two transcontinental lines available and the company has terminal rates from the plant to any point in the middle west or east. The rates at the present time by rail to Wisconsin are $12.00 per ton; to Chicago $13.00 per ton, and to Michigan $14.00 per ton. The company has been advised however, that it can secure a rate of $9.00 per ton to Wisconsin points, with a corresponding rate to the other territories. Inasmuch as ships can land at its own docks on any tide, at any time, and because of the desirability of pulp for cargo to New York City, or the eastern coast, it has been quoted a rate of $6.00 by measurement per ton of 51 cubic feet and has assurance that when the amount of tonnage is definitely determined, it can secure a lower rate on a yearly contract.

Want I. P. to Erect Mill Now

MONTREAL, Que., October 28, 1929.—From St. John, N. B., it is announced that the New Brunswick Government has asked the International Paper Company to implement its promise to construct a 100-ton paper mill on the Miramichi in return for concessions granted to the company. The matter was recently the subject of a conference in New York between the International Paper Company and representatives of the provincial government. Among those present at the meeting was Premier Baxter, accompanied by the Hon. Leonard O'Brien, Speaker of the Legislature, who took the matter up with Mr. Graustein and his associates. Other members of the provincial party included representatives of the Miramichi district. So far as is known it is believed representatives of the company will shortly come to the province to further discuss the project.

Dalhousie News Print Mill Nears Completion

Designed for Four 226-Inch Paper Machines, First Unit of International Plant In New Brunswick Is to be Installed About January 1, Next — Second Paper Machine Will Follow Shortly Afterwards—Ground Wood and Sulphite Mills Will be Ultra Modern

The construction of the new mill of New Brunswick International Paper Company at Dalhousie, New Brunswick, is going forward in a satisfactory manner and it is expected that the first machine will be installed about January 1, 1930. The second machine will follow a few weeks later.

The mill is located on tidewater near the head of the Bay of Chaleur in northern New Brunswick. Shipments of paper can be made by boat at least nine months of the year and by rail at all times. Railroad sidings extend into the yard of the mill for incoming and outgoing freight, and two wharves will be available for the shipment of paper, coal, sulphur, lime and any other commodities that may be brought in by boat.

Capacity of the Plant

The mill is designed for four paper machines with an estimated capacity of 550 tons of news print paper per day. At the present time two machines are being installed as well as the ground wood and sulphite equipment necessary for a balanced news print mill. In the near future two more paper machines will be installed together with the necessary auxiliary equipment.

With the two machines in operation, between 300 and 400 men will be employed continuously. When the two other machines are added the number of men required will be further increased. The logging operations will also be extended to meet the requirements of the plant and during the season 1,000 to 1,200 men will be required for this work.

Exceptional Engineering Features

Building a mill at Dalhousie necessitated some exceptional engineering features so that it would have both rail and water shipment, an ample supply of fresh water, and accessibility to timber limits. In order to provide a site suitable for a paper mill it was necessary to build a sea wall and hydraulically fill a large area to bring it up to an elevation of seven feet above the average tide level. This work is practically finished and approximately 640,000 cubic yards of earth have been filled in on the mill yard and site.

The second major problem was to obtain an adequate supply of pure fresh water. It was necessary to construct a dam across the Charlo River, eight miles from the site of the plant to create a storage reservoir. This dam is of standard arch concrete construction with an over-all height of approximately 180 feet. One 32-inch pipe line is practically installed between the dam and the mill and provision has been made for an additional line of the same size. The intake of the pipe line is at an elevation of 141 feet and water will come into the mill at a slight pressure through the screening system, where it will be pumped to the various departments.

Equipment of Plant

Much care has been given to the selection of equipment for this plant in order to select the most modern and proven machinery for a high speed news print paper mill. The boiler house will be equipped with two 1,200 hp. boilers designed for four hundred pounds pressure and using pulverized coal, and with water-walls and and pre-heaters. The steam from these boilers will pass through a 6,000 hp. turbine to reduce the pressure to 125 pounds and at the same time produce considerable electrical energy as a by-product of this operation. The 125 pound steam will then be used in the paper mill and sulphite department.

The ground wood mill will be equipped with twelve hydraulic magazine grinders of the latest design. Each pair will be driven by a 2,400 hp. synchronous motor. The auxiliary equipment will be of the latest and most practical design.

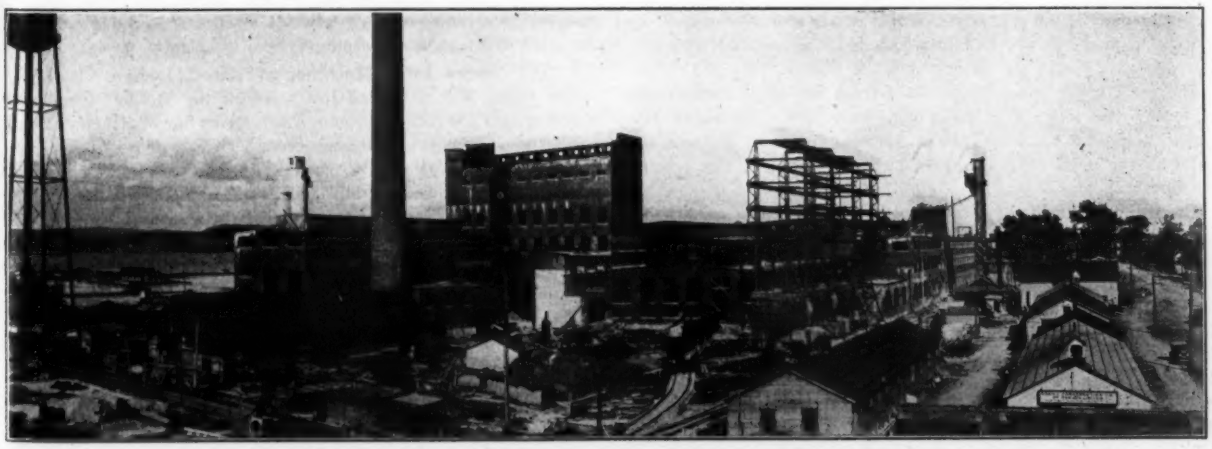
The sulphite mill will be equipped with three digesters each 15 feet x 47 feet having a capacity of approximately twelve tons per digester. An acid accumulator of the latest type will also be installed in the sulphite mill. The screening room, which is adjacent to the sulphite and ground wood mills, will have deckers, filters and other auxiliary equipment that has proven to be satisfactory in the screening of sulphite and ground wood pulp.

Each paper machine room will have two 226 inch news print paper machines of the latest type designed to operate at speeds up to 1,200 feet per minute and to produce 137 tons of paper per day. The second machine room is designed for two duplicate machines which will double the capacity of the plant. The latest type of winders with rider rolls will be used to wind the news print, which will be wrapped directly behind each machine and lowered to the floor below to be stored or shipped.

Pulpwood Supply

With two machines the mill will use approximately 100,000

(*Continued on page 65*)



NEW BRUNSWICK INTERNATIONAL PAPER CO. PLANT AT DALHOUSIE, N. B.

Mersey News Print Mill Is Ideally Located

Large Modern Plant of Mersey Paper Co., at Liverpool Bay, N. S., One of Few Mills Situated At Tide Water—Rapidly Nearing Production Stage, Plant Is Equipped With Two 234-Inch Machines With Daily Capacity of 250 Tons—Raw Materials Near at Hand

The large news print mill of the Mersey Paper Company, Ltd., which is situated at Liverpool Bay, Nova Scotia, is at this time rapidly approaching the production stage. The Mersey mill is one of the few paper mills situated on tide water. It has the decided advantage of a location at a protected port from which year-round shipping is available. Coupled with this feature is the fact that its geographic position makes its distance by water from New York City, the greatest news print using center of the world, only about 480 miles.

Ample Pulpwood Available

For years Nova Scotia has been a pulpwood producing Province. There have been several small ground wood mills in operation but no wood-using industry has been developed in the Province of any appreciable size up to this time. This has meant that considerable wood in the form of pulpwood has been exported annually to the United States. With the advent of this large news print mill a more economic use for Nova Scotia's natural resources will be employed. Although this part of the country is one of the older parts of Canada, there is still ample cheap wood available and the Mersey mill will obtain its raw material from practically all parts of the Province. This wood will be delivered both by rail and water; the water shipments largely coming by boat since ocean transportation is necessary in most cases.

The company enjoys a further advantage in that it is located within a few hundred feet of one of the main branches of the Canadian National Railways. The small amount of rail shipments, which will be mostly in the Province, can therefore be handled quite readily.

Adequate Power Provided

The mill is being at present constructed as a two-machine 250-ton capacity news print mill. It therefore requires in the neighborhood of 19,000 h.p. for its operation. This power is being furnished by the Nova Scotia Power Commission from three large developments which are at present being completed on the Mersey River. The power enterprise makes use of the water in this river at three different points where large dams and power houses have been erected. The Commission have a total installed capacity in generators of 28,000 h.p. This power will be brought a distance of some twelve miles by means of a 66,000 volt transmission line to the high tension substation, which is located at the mill. The paper company is the sole buyer of this power and by means of its contract with the Power Commission it is to be provided with further adequate power for extension to its plant.

The fresh water supply is obtained from two lakes immediately adjacent to the mill. Regulating dams have been constructed with proper screening facilities and a 42-inch pipe line delivers the water to the mill. The storage capacity is sufficient for a four-machine mill.

The main points in the location of the mill, such as geographic position, raw material, power, water supply and transportation, as described above, are further augmented by advantages in some of the requirements of lesser importance. These are coal, which is near at hand in the Province and will be of low cost; sulphur, which will all be brought in by water and should be as cheap as for most news print mills in Canada; and limestone, which is in abundance in the Province, and as a matter of fact the company owns its own quarry nearby to the mill. It is readily seen then, that all factors which will lead to low cost in production have been carefully looked into by the sponsors of this big enterprise.

The mill itself forms one of the most compact and imposing groups of buildings as yet seen in the industry. The main departments, such as the Ground Wood Mill, Sulphite Mill, Mixing Department, Paper Machine Room, Finishing Room and the Storage Building, are all connected into one group. The Wood Handling plant is connected by an elevated covered-in conveyor structure to the main building, and lies between the wood storage and receiving points and the mill proper. The most remarkable feature about the plant is that it is possible for one to visit any part of the mill from the main office building without having to go outside at any time.

Favorable Location of Plant

The mill lies almost in a north and south position. At the north the railroad passes within a few feet of the mill, and convenient switching arrangements have been provided so that cars are easily taken into the mill yard. The Office Building, Stores and Machine Shop occupy this end of the plant. These have been arranged most conveniently and are very compact in form. The High Tension Sub Station and Low Tension Transformer Room, and also a third room where the complete electrical control for the whole plant is taken care of by means of modern switching equipment, are located in this part of the building. Just south of this section is the Ground Wood Mill. Here twelve large continuous grinders, electrically driven, are used to manufacture the ground wood pulp, the wood being delivered to these grinders in large block bins overhead. South of the Grinder Room is located the Mixing Room where the fine screening, thickening and filtering of sulphite and ground wood stock and white water takes place. In the basement of this building are also located the stock chests, agitators and pumps of various descriptions.

The Sulphite Mill

To the east of the Ground Wood Mill and Mixing Room is located the complete Sulphite Mill. The Acid Plant for producing the necessary sulphite cooking liquor is of Jenssen design. The actual cooking of the stock is done in three large Dominion Bridge Company Digesters. The Chipping Department for preparing the chips in the sulphite process is located just north of the Digester Room and is composed of the most modern machinery, and is very compact in character. The stock produced in the Digesters is blown into three large wooden blowpit tanks and from here is pumped overhead to a large concrete equalizing tank. From here the stock flows to the screening system by gravity.

News Print Machines of Latest Design

The Paper Mill is located just south of the Mixing Room, and here are two 234-inch Dominion Engineering news print machines of the latest design and a capacity of 250 tons daily. These machines are each capable of a speed of 1,200 feet a minute and have as their motive power the Harland Sectional Electric Drive. The Finishing Room is located just south of the Paper Machine Room in the same building. The paper, after being finished and wrapped, is delivered to a lower level by means of a delevator, from whence the paper goes by means of a conveyor some distance to the large Paper Storage Warehouse located on the company's docks. This warehouse has a capacity of about 6,000 tons of paper. The paper will be delivered from here to the company's own paper carrying vessel of special design, which will carry it to the market. All features of handling have been gone into very carefully and arrangements have been made so that paper will be handled in the warehouse and to the ship with the minimum amount of damage.

In the Paper Machine Basement are located the tanks and pumps necessary for delivering stock to the paper machines, and also the Control Switchboard and Generator Sets for the Harland Drive. There is also a large Continuous Beater for the handling of broke paper.

Boiler Plant Equipment

East of the Paper Machine Room is the Turbine Room and connected with this is the Boiler Room. Here three 900 h.p. Kidwell Boilers and one dutch oven boiler for wood waste, comprise the steam producing section of the plant. The boiler plant has been built by Foster Wheeler and their equipment includes the Foster Wheeler unit pulverizers, Foster Wheeler superheaters, sectional air preheaters, induced and forced draught fans, and individual Prat-Daniel stacks for each boiler unit. The plant will operate at 420 pounds pressure with about 100 deg. superheat. All the steam from the boilers is delivered to a 5,000 k.w. Fraser & Chalmers Turbine Generator in the Turbine Room. This turbine is of the pass-out type whereby steam for the Sulphite Mill is taken from the high pressure stage at 150 pounds pressure. The remaining steam passes through the low pressure end of the turbine and is delivered for use in the paper machine driers, Ross economizers, and general mill heating system at a pressure of 15 pounds per square inch. In the Turbine Room is also located the boiler feed pumps, feed water heater, mill booster pumps, and air compressors, and also the switchboard for the turbine generator. This generator is tied in with the main power delivered to the mill, at the control room, and will automatically take up certain important sections of the mill load in the event of power failure of the hydro plant.

Modern Coal Handling Machinery

Coal is delivered by boat to a special coal dock. Here unloading equipment is provided to deliver the coal from the ship's hold to an elevated hopper, from whence the coal is carried in an electric car on an overhead railway to the track hoppers, from whence it is taken by means of a drag scraper to the storage pile. The coal from the storage pile is reclaimed by the drag scraper and is carried by a skip hoist to the coal tower, and after crushing and passing over a magnetic separator, it is delivered to the bunkers over the boilers. The coal handling equipment has been furnished by the R. H. Beaumont Company, and is composed of machinery of the very latest design.

The above gives but a brief description of the plant and machinery of this new industry. The mill is not quite complete at the present time, but indications are that the first paper will be produced in the month of November.

Quality Product in View

The paper industry, which is now Canada's second industry of importance, like other industries has made enormous strides towards progress in the last few years. Both plant and machinery designs have been varied to suit the demand for lower cost production and to cut down waste to the minimum. It can safely be said that this latest addition to this great industry has in no way overlooked the possibilities for making cheap paper. As in other industries also, the standards of quality are most rigid in this day, and the news print industry is, partly on account of the highly competitive market, producing the best quality in its history. Here again the machinery and equipment of the Mersey Mill, while of standard design, have been arranged with the idea of quality of product definitely in view.

Developing Natural Resources

The Province of Nova Scotia, which has long awaited the development of some of its vast natural resources, is fortunate indeed to possess this modern mill, which should in time give a very creditable account of itself and act as an excellent revenue producer for the good of all concerned.

DALHOUSIE NEWS PRINT MILL

(*Continued from page 63*)

cords of wood per year, and double this amount when the four machines are operating. This pulpwood will be cut on the company's holdings and on Crown lands located in the water shed of the Restigouche River. The wood will be driven down the rivers and brought into the mill by booms during the summer. It is estimated that under the adopted methods of scientific cutting and logging which allow for the natural regrowth of the forests, the available supply of wood from the Company's owned and leased holdings is more than sufficient for perpetual operation of four paper machines.

Power Supply

The electric power to operate the mill will be obtained from the new hydro-electric plant of Saint John River Power Company at Grand Falls on the St. John River. The electric energy will be sent to the mill over a 132,000 volt steel tower transmission line approximately 110 miles long. Transformers at the mill will reduce the voltage for local operation. For two machines, 20,000 hp. will be required for the regular operation of the mill. Surplus power will be used to generate steam in a 1,600 kilowatt electric boiler. When the two additional machines are installed, the power requirements of the plant will be doubled and less will be available for the electric boiler.

Umpqua Pulp & Paper Co. Offers Stock

The Umpqua Pulp and Paper Company, recently organized under the laws the State of Oregon, with an authorized capital of 25,000 shares 8 per cent cumulative preferrred stock, fully paid and non-accessible par value common stock on par value, voting, fully paid and non-assessable common stock no par value, is offering subject to prior sale the unsold portion of $1,000,000.

As previously announced the Umpqua Pulp and Paper Company plans to operate a mill at Gardiner, Oregon, making high-grade unbleached sulphite pulp. The site at the converging of the Umpqua, Smith and Scofield rivers is about eight miles from the Pacific ocean and includes 53 acres. Through its subsidiary the Gardiner Mill and Lumber Company, the paper company will have control of 25,000 acres of timber lands, which together with holdings will involve some 800,000,000 feet of timber. It is expected that this affiliation of sawmill and pulp plant under control of the latter, will provide economies in operation, logging, fuel and shipping, as well as in labor and other expense phases. The company expects to obtain its water supply at low cost from Lake Tahkenitch which has a shore line of 95 miles.

The issue of stock now being offered is to provide funds for the erection of a modern pulp mill with a minimum capacity of 100 tons of unbleached sulphite pulp per day.

The stock offered at $100.00 per share and a bonus of one share of common stock with each two shares of preferred. Executive offices are in the Bedell building. Joseph Kaster is president and general manager; W. L. Nederhoed is vice-president and sales manager, and R. E. Loomis is secretary-treasurer. Other members of the directorate include Percy A. Cupper, hydraulic engineer and W. Lair Thompson, attorney.

Marathon Plant Addition Nearly Completed

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., October 21, 1929.—Progress on the large addition to the plant of the Marathon Paper Mills Company at Menasha, Wis., is so rapid that the building probably will be completed sometime in December. The foundation walls and concrete floor in the basement are completed and most of the forms have been built for the concrete side walls. The building is to house the press room of the carton division, where considerable new machinery will be installed so as to increase efficiency and production, as well as to augment the present multi-color printing facilities.

New Kraft Mill at Mobile Ala. To Start Soon

Gigantic Plant of International Paper Co. Located Near New State Docks Ensuring Speedy Delivery of Coastwise Shipments to Eastern Markets—Mill Will Produce 200 Tons of Sulphate Pulp and 175 Tons of Kraft Wrapping Papers and Bag Papers

The Mobile, Alabama, mill of the International Paper Company, Southern Division, the most modern kraft mill in the United States, is fast nearing completion. This mill will produce 200 tons of sulphate pulp and 175 tons of kraft wrapping and bag papers.

The site is four miles due north of the city of Mobile near what is known as Magazine Point, on the Terminal Railway of Alabama's wonderful new $10,000,000 State Docks, giving ideal outlet for the product for coastwise shipment to the eastern markets.

Power and steam will be supplied by the Southeastern Production Company, from its new and very modern power plant located adjacent to the mill.

A system of wood yard conveyors has been devised permitting wood to be handled both by rail from territory tapped by five railroads; and by barge service from the Alabama and Tombigbee Rivers, through the Mobile Bay to a mill owned deep water canal.

The wood department includes two American barking drums 30 feet long, two 88-inch Carthage chippers, two new type Ryther & Pringle chip screens, with Lombard crushers to produce chips of the proper size. The wood room building is 69 by 88 feet reinforced concrete brick and steel construction.

From the wood room to the digester chip bin, which has a capacity of 36 hours run, the chips are handled by two Sturtevant 96-inch blowers with cyclones over the digester house.

Pulp Mill Section

The pulp mill section, housing digesters, diffusers, wet machines and evaporators, is one building—reinforced concrete brick and steel construction with gypsum roof deck and built up waterproofing—210 feet long, 100 feet wide, 98 feet high. Digester, diffuser section three stories, wet room two sections, and is equipped with eight Blaw-Knox stationary digesters of 3¾ tons dry weight capacity, twenty special type diffusers, four blowing systems with cyclones and condensers, one 4 effect Mammoth Swenson evaporator, four Packer 10-plate flat screens, three Bird pulp screens, five Allis-Chalmers rod mills, five Oliver deckers and one Rogers D. P. wet machine.

The caustic plant and chemical storage is of reinforced concrete brick and steel construction, 294 feet, 50 feet wide, caustic room section three stories, balance one story and contains one large causticizing tank of special design, with ample settling and storage tanks, Mount sludge filters, Vulcan lime recovery kiln 9 feet by 100 feet for recovery of lime sludge.

The recovery department, 199 feet long by 106 feet wide, reinforced concrete brick and steel construction, two story, is equipped with eight rotary incinerators and disc evaporators by Manitowoc and eight special design smelters and dissolving tanks.

Paper Mill Section

Approaching the mill along a graveled highway the first building in sight is the paper mill section, one building 1,427 feet, 10 inches long and 160 feet wide of reinforced concrete brick and steel, gypsum roof deck and built-up waterproofing, consisting of switchboard room, beater and machine room, finishing and shipping department and two-story bag factory, 640 feet long.

Some idea of the magnitude of this building may be had from the fact that it is 107 feet 10 inches, more than one-quarter of a mile long.

The switchboard room is on the extreme north end of this building and houses the 60 panel board controlling the distribution of power to all departments of the mill, these panels in addition to regular equipment contain metering equipment, giving separate power readings for each department.

The beater room contains 6 Dilts high speed special kraft beaters 72 by 60 inches—three for each of the fourdrinier machines and two special Dilts 66 by 60 beaters for the Yankee machine, as well as three 62 by 48 inch New Type Dilts broke beaters.

Jordan equipment consists of ten Miami No. 6 and three Miami No. 2 Shartle Jordans and Feeney stock regulators and Trimby consistency regulators.

There are two Beloit high speed 211-inch fourdriniers equipped with removable wet ends, suction couch, suction first press, and standard second and third presses and smoothing presses; 38—5 foot driers, Timken roller bearings, throughout, and the new Beloit silent chain drive which eliminates rope drive and gears on back side of driers, the chain operating in enclosed oil passages on back side permits free access to driers from the rear, which is a great improvement over regular system of drier drive.

No. 1 machine has one 9 roll Farrel stack, and No. 2 has two stacks of calenders, each machine equipped with Beloit double drum speed winders.

The 172-inch Yankee machine is also a Beloit removable fourdrinier with 12 foot Yankee drier and additional 4 foot driers, one stack of calenders and Beloit winder.

The Finishing Room

Finishing room has one 210-inch Duplex heavy duty 12 roll cutter and one 172-inch Duplex cutter both furnished by Beloit, the 210-inch equipped with Moore and White layboy. A Seybold 84-inch trimmer and two sets of Howe weightographs for weighing paper, and an overhead electric monorail system of paper handling from the machines.

The bag factory will be operated by the Continental Paper and Bag Corporation and will be equipped with sufficient machines to make all sizes of bags at the rate of 125 tons of finished bags per day.

Water supply for the mill is furnished by eight Layne Gravel wall type vertical motor multistage pumps, furnishing 6,000 gallons per minute, minimum.

The mill is sprinklered throughout by the Globe Automatic System, in connection with 125 foot high 75,000 gallon fire tank.

In connection with recovery department there is one Rust Reinforced concrete chimney, 205 feet high above ground.

Machine shop, blacksmith shop, welding room and storehouse, one building 50 feet wide, 300 feet long, equipped with latest type shop and storehouse equipment, eliminates the necessity of outside shop work in connection with maintenance. A Farrel roll grinder large enough to handle largest roll is also part of the maintenance equipment.

Control laboratory in connection with mill is equipped with every conceivable equipment for complete chemical control of manufactured product and paper testing.

In one section of the laboratory is a first aid room with equipment permitting first aid treatment to injured employees. This equipment is very complete and the department is in charge of a competent graduate nurse.

Just south of the mill and adding much to the attractiveness of the plant are the administrative building and time offices—brick structures in Old English design, large and airy rooms lined throughout with Celotex for insulation and sound deadening.

The time office is equipped with International electric time clock system controlled by Master clock in the administrative building.

As a finishing touch the grounds around the offices are now being beautified with shrubbery, flowers, drive and walkways.

A. P. W. Paper Co. Installs New Fourdrinier

Adds To Already Imposing Plant of Ten Machines Another Unit of Greatly Increased Size and Speed and of Combination Type Suitable for Manufacturing Papers from the Lightest Weight Tissue Up to the Heaviest Crepe Towels—Machine Built by Pusey & Jones

It is one thing to design and construct a machine for manufacturing a certain kind of paper, but another to provide a machine to manufacture a diversity of papers and at the same time insuring simplicity of operation and minimum maintenance with maximum production. This, however, was accomplished in connection with the design and construction of the paper machine installed early this year in the new and modern plant of the A. P. W. Paper Company, Albany, N. Y.

As already generally known, the pioneer high-speed wide tissue machine was designed and constructed by Pusey & Jones Corporation over five years ago, since which time several additional duplicate installations have been made. It remained for the A. P. W. Paper Company, however, to vision the future requirements of the trade and add to their already imposing installation of ten machines manufacturing tissue and crepe towel papers, another unit of greatly increased size and speed and of combination type suitable for manufacturing papers from the lightest weight tissue up to the heaviest crepe towel.

Several very fine illustrations of the machine, and surrounding auxiliary equipment and mill construction are presented herewith. The machine itself, known as the Pusey & Jones P. M. 1538, is of the following brief specifications:

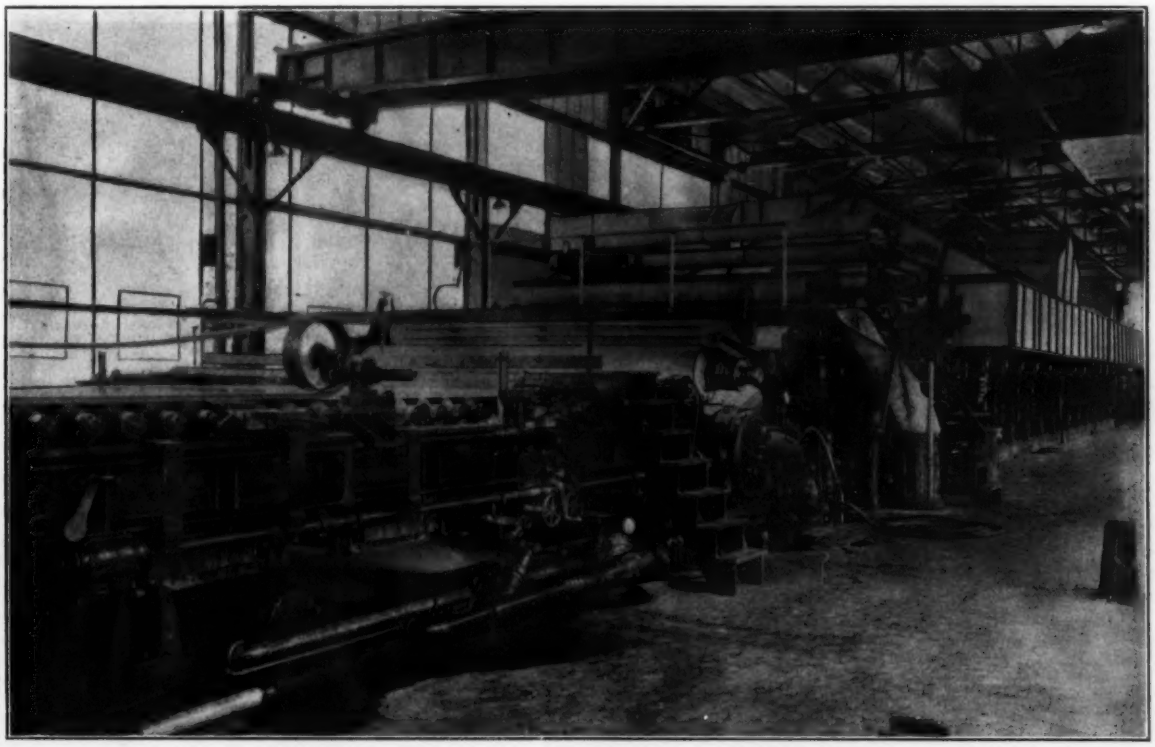
Fourdrinier part 178 inches wide for wire 176 inches wide, 65 feet long, to run at speeds up to 800 feet per minute. Gun metal breast roll, 24 inches diameter. Suction couch roll 30 inches diameter. Six oscillating suction boxes of special heat-treated aluminum. Sheet brass save-alls. Fourdrinier part of the type known as the Aldrich patented removable and high speed shaking arrangement, combined with the latest Puseyjones improvements. The shakehead will be adjustable while running, and driven by a direct connected variable speed motor.

The 176 inch press part contains two presses, both running in the forward direction, and with sufficient equipment to carry a 50-foot first felt and 48-foot second felt. In the first press, the upper roll is 24 inches in diameter, of light weight construction and face covered with rubber, and the lower one is a suction roll 25 inches in diameter.

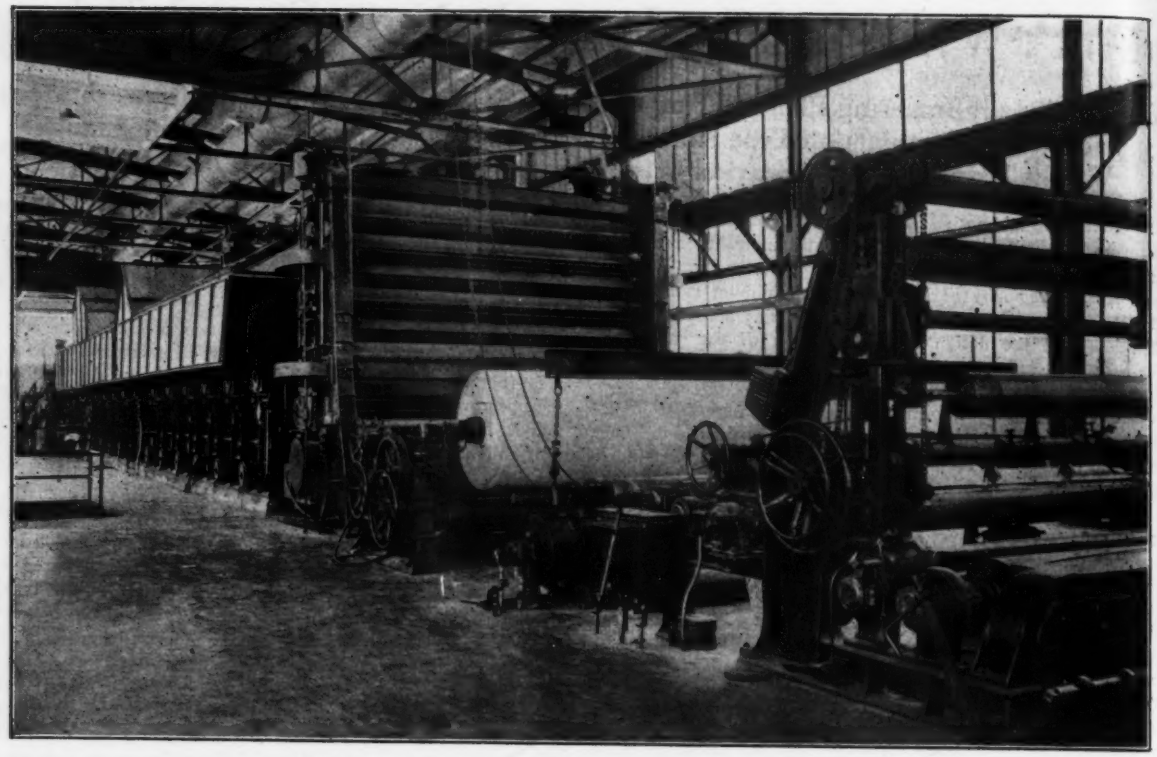
In the second press the 24 inch upper roll has a cast iron body with a gunmetal casing forced over it, and the lower roll, 26 inches in diameter, is rubber covered.

A smoothing and crepeing press is mounted on the end of the dryer frames. The 24 inch upper roll is rubber covered to a rather high plastometer reading. The 36 inch lower roll is made of close grained cast iron and of similar construction to a dryer, with one journal fitted with a steam joint and syphon pipe so that the roll may be heated if desired. Also a ratchet lifting device controls the arms of the upper roll so that it may be raised off the lower roll. Also there is furnished equipment to carry a Tompkins, Hawley, Fuller patent pickup felt to take the paper from the wire at the couch roll and carry it through the two main presses to the smoothing press.

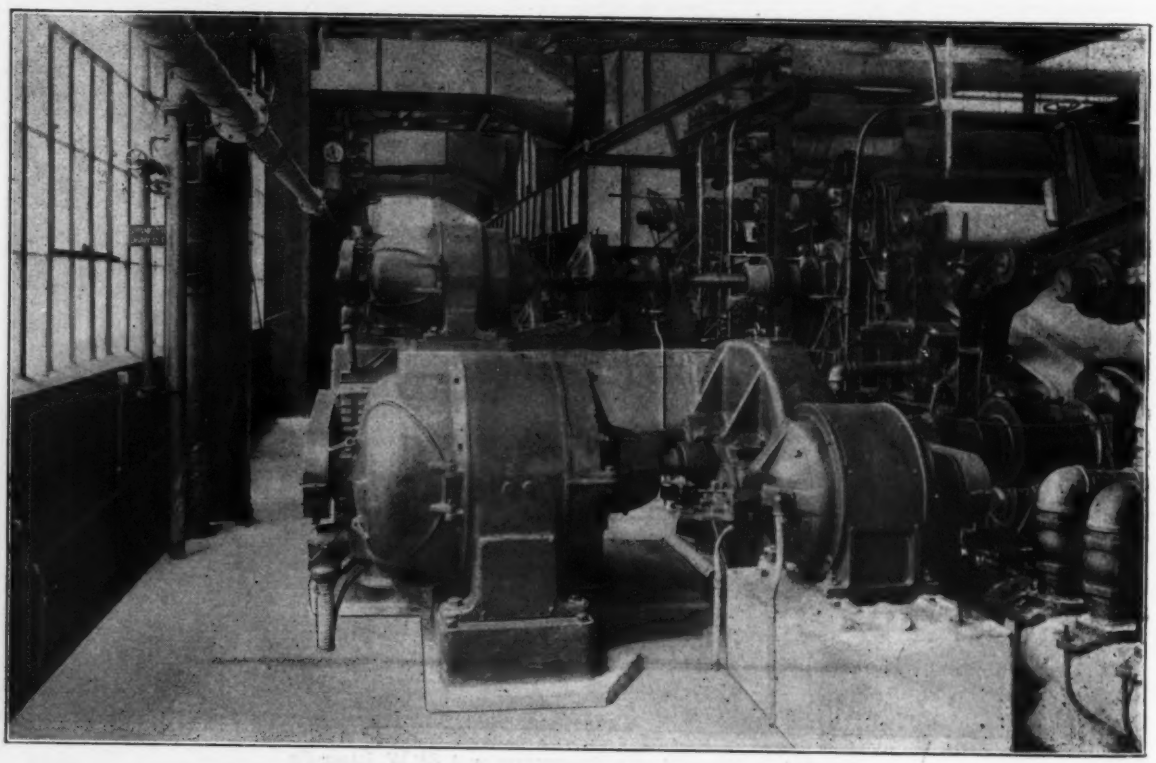
The dry part comprises twenty-four cast iron paper driers,



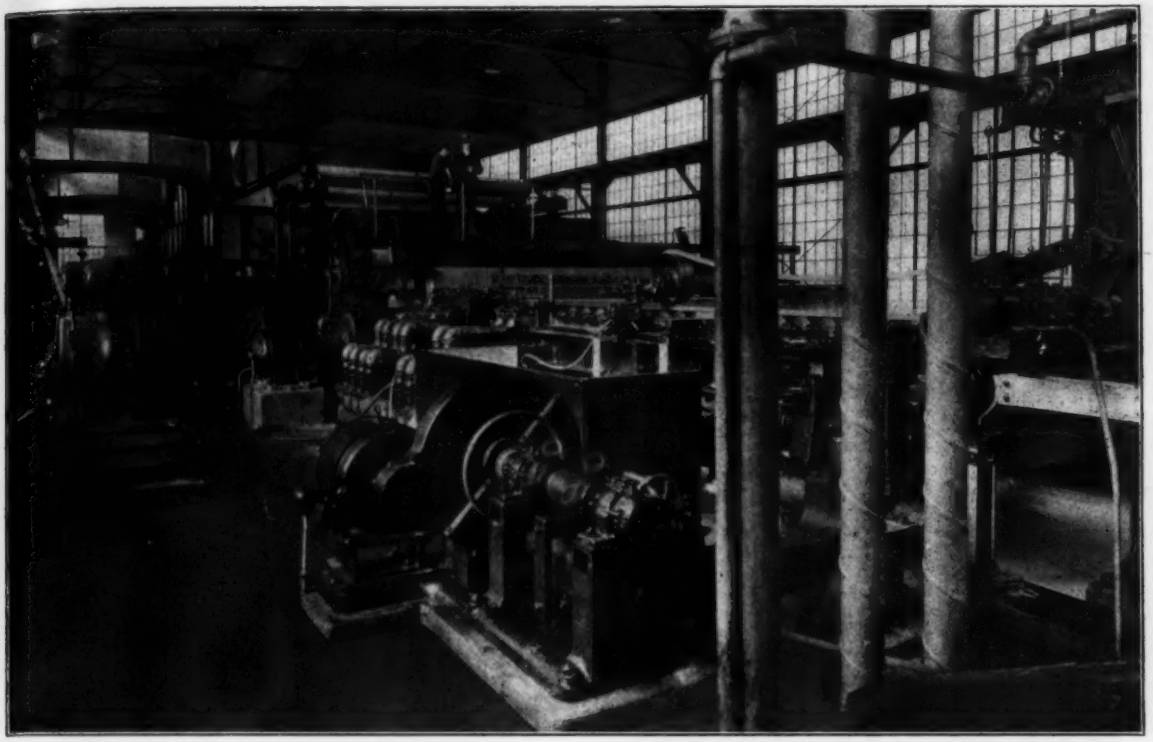
WET END OF NEW 178-INCH FOURDRINIER OF A. P. W. PAPER CO.



DRY END OF 178-INCH FOURDRINER FOR TISSUE AND CREPE PAPER.



DRIVING UNITS ON WET END OF NEW 178-INCH FOURDRINIER.



DRIVING UNITS ON DRY END OF NEW 178-INCH FOURDRINIER.

each 60 inches in diameter 174 inch face, arranged in two horizontal tiers, and served by two felts or canvasses. Two cast iron felt dryers, each 48 inches in diameter. Puseyjones combined steam joints and safety valves, and internal syphon pipes, and air outlet valves. Ductors with bronze blades and pressure arrangements on all the lower and last upper paper dryers. Sheahan patent paper feed and carrier.

One stack of 172 inch face Farrel chilled iron Calenders, comprising nine rolls, one 18 inch top roll, six 14 inch and one 18 inch intermediates and one 30 inch bottom roll. A gravity feed oiling system for continuous lubrication of all the bearings. Electric lift for the upper rolls. Frossard patent ductors and feeds.

A uniform speed reel, of Pope patent design with two paper reeling drums each 10⅝ inches diameter, and one spare drum. Driving drum 42 inches in diameter. Maximum diameter roll of paper that can be wound on this reel is 42 inches.

Unwinder of the geared type to receive the drums filled with paper taken from the reel.

One slitting machine combined with a two-drum uniform speed winder. Six upper slitters, 6 inches in diameter Koegal patents, six lower slitters, 12 inch diameter double edged. Lower slitter shaft separately driven. The whole winder to be driven by a General Electric Company special variable speed motor and control.

Drives of General Electric Company motors and Falk gear units. The speed ranges of these drives are very versatile, permitting plain papers such as newsprint and hanging to be made as well as permitting the wet end of the machine to be speeded up one-third faster than the dry end when crepe papers are made.

The selection and later design and construction of the drive required careful consideration on account of the extreme flexibility of the requirements, necessitating an unusually numerous arrangement of different mechanical combinations. A very good description of the drive and its method of functioning was given in the June 20 issue of the PAPER TRADE JOURNAL in an article by F. M. Roberts of the General Electric Company.

All records for speed and production on the different grades and weights of papers have been broken by this machine in recent months, although for obvious reasons it is impossible to submit any detailed data here.

Stebbins' Pacific Coast Installations

Stebbins Engineering and Manufacturing Company, Tacoma Branch office, at 301 Washington Building, Tacoma, Wash., report having completed installating during the year ending October 1, as follows:

Two Digester Linings for Sitka Spruce Pulp and Paper Company, Empire, Ore.; two Digester Linings for Oregon Pulp and Paper Company, Salem, Ore.; one Digester Lining for Spaulding Pulp and Paper Company, Newberg, Ore.; one Digester Lining for Columbia River Pulp and Paper Company, Vancouver, Wash.; one Digester Lining for Rainier Pulp and Paper Company, Shelton, Wash.

Contracts have been closed for digester, blow pit, bleaching system and stock storage tanks for the extension to sulphite plant of Crown-Zellerbach Paper Company, Camas, Wash., also for five digesters to be installed by the Puget Sound Pulp and Timber Company at their new plant, now under construction at Everett, Wash.

L. W. Dimmock is in charge of the Tacoma branch, supported by a well organized staff, including the required crews of skilled men to service field work. The outlook for future busines is very encouraging and it now appears certain that the Pacific Coast trade, in general, has accepted the establishment of a branch at Tacoma as a real factor in maintaining Stebbins service to the chemical pulp industry.

Bellingham Mill Additions Double Capacity

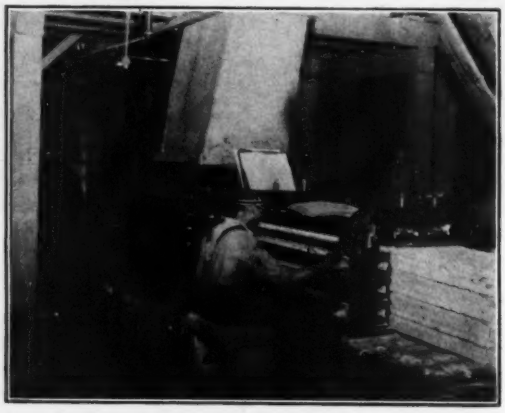
Additions Made To the Mill of the Puget Sound Pulp & Timber Company, at Bellingham, Wash., Double the Capacity of the Plant From 40 Tons Per Day To 80 Tons Per Day of Unbleached Sulphite—Several Units Completed September of This Year

Work on the second unit of the Puget Sound Pulp & Timber Company, San Juan Div. was started in the month of May, 1928, and completed in September of the same year, at a cost of approximately $300,000. The following additions were made to the plant:

One 817 hp. Stirling type water tube boiler, equipped with all the latest equipment, such as injectors, draft regulators, feed water controls, etc. Fuel bunker with storage capacity for two weeks hogged fuel.

Boiler house was increased to twice its original size to house the additional 817 hp. boiler.

Wood room building was enlarged to take care of additional

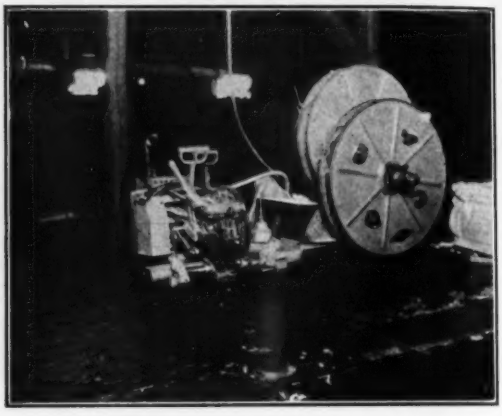


MECHANICAL BALER.

wood room machinery for increased output of chips. One large Hesse Ersted 63-inch chipper and one 51-inch Hesse Ersted chipper were added. One Hesse Ersted chip screen and two Traylor Supreme chip screens.

A new chip elevator was installed to do away with the blowing of chips to the digestors as heretofore. Numerous conveyors in connection with the making of chips were also added.

The Acid Plant was originally built for a ninety ton mill. However 20 feet were added to each of the limerock towers to in-



STRAPPING MACHINE.

crease the efficiency, bringing them to a height of 100 feet.

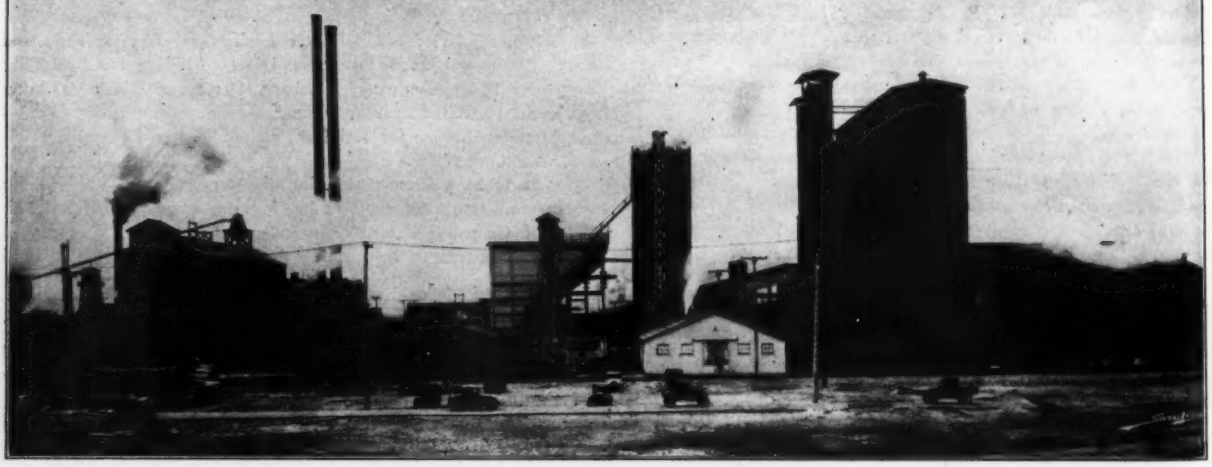
One additional acid storage tank was installed.

Two steel sulphite digestor shells 15 feet x 49 feet, built by the Puget Sound Machinery Depot, of Seattle, and lined by the Stebbins Engineering Company of Watertown, N. Y., with a thickness of lining of 6 inches.

Two additional blow pits and vomit stacks were installed to take care of the additional production.

Additional gas cooler containing 800 sq. ft. of cooling surface installed by G. D. Jenssen & Co.

Three Thune rotary screens—nine plates each, four 14 plate



PLANT OF THE SAN JUAN DIVISION OF THE PUGET SOUND PULP & TIMBER CO., BELLINGHAM, WASH.

PULP READY FOR SHIPMENT.

and one 12 plate standard Smith and Valley Iron Works flat plate diaphragm screens, were installed, giving ample screening capacity for 95 tons if necessary.

Two Sumner improved 72 inch double press wet machines with reduction gears to speed up or slow down machines are required.

Two Proctor 13-unit 8 feet automatic single conveyor wood-pulp dryers arranged with hood and side structures to carry shredder and comb, with a capacity of 25 tons of 95 per cent air dry tons per 24 hours for each dryer. Each dryer is 88 feet long and 11 feet wide, and 9 feet 6 inches high, manufactured by Proctor & Schwartz, of Philadelphia.

Two heavy duty Hesse Ersted mechanical balers capable of baling a production of 90 tons in 24 hours, and compress the shredded pulp when 95 per cent air dry to a density of 51 cubic feet per ton of 2000 lbs.

One Weldfast package strapping machine operated electrically which takes care of all the production.

One Biffar refiner for the refining of knots into screenings.

Additional warehouse for 500 tons of pulp.

All additions were completely equipped with automatic sprinklers. Additional Fairbanks Morse motors were installed, together with additional pumps, conveyors, etc.

Smith Paper Co. Completes New Machines

The Smith Paper Company, makers of fine tissue papers, of Lee, Mass., have recently completed the installation of an additional paper machine at their Columbia Mill, and one at their Niagara Mill. Both were designed for the production of condenser paper, and with those already in operation give them seven machines running on this type of paper.

New buildings, including machine room, beater rooms, and finishing room are laid out so as to produce the most efficient results, especially in the elimination of conducting particles or other foreign substances, and the machinery is of the latest design for this extremely thin paper.

New Strathmore Community House Completed

Woronoco has every reason to be proud of the new community house of the Strathmore Paper Company, not only in a structural way, but in a community way. Memorial Hall was built in 1920, a monument to the many Strathmorean employees who served their country during the great war. The original site and plans were considered with an eye to the future needs of this rapidly growing Strathmore town.

Memorial Hall, which is the left wing as shown in the accompanying picture, has served as a church for all of the people of Woronoco. It has been the scene of many social gatherings. Its well equipped kitchen and commodious hall in the basement made it particularly suitable for many of the good old chicken-pie suppers, for which the ladies in this village are so justly famous.

This building, however, was entirely unsuited for the various athletic games, such as basket ball, volley ball, etc. These games were played, under great difficulty, in the old Casino, where the playing surface was just large enough for the teams in action. In consequence, it was very difficult to accommodate the crowds that would like to have supported these various sports, and eventually attendance and interest fell off.

Women's classes, boys' and girls' clubs, men's clubs, and Junior Achievement classes were all held at the old Tekoa Hall. Because of the unfortunate congestion, you can be sure that many an evening was spent untangling the various differences and conflicting dates between these various organizations.

Mr. Moses, realizing conditions as they were, instructed the engineering department to plan a building that would take care of all, so now Woronoco has the new Community Building— and here are the details.

It has a straight frontage of 102 feet, and is a two-story structure, with a basement of concrete foundation and brick superstructure with stone trimmings.

The right wing houses the gym. This, of course, will be used for basket ball, volley ball, gym classes, dances, fairs and exhibits of every description. The dimensions of the gym are 40 × 100 feet, with a balcony for spectators at both ends and along the sides, with a seating capacity of 500 people. In the basement are lockers and showers to take care of women and girls as well as the men and boys; a kitchenette, three rooms for Junior Achievement work and storage. There is a large committee room, 20 × 50 feet, which is capable of being sub-divided into four class rooms.

A large billiard room, 35 × 25 feet, features the first floor, and is connected to a social room 15 × 35 feet, with a porch facing the miniature Niagara Falls in the rear of No. 1 Mill. The dimension of this porch is 12 × 20 feet. There is a coat room 10 × 10 feet, and a library 8 x 12 feet.

There are two stairways in this section of the building, one of which leads to the gymnasium, and the other to the second floor of the building. This floor contains the boys' club room, 16 x 40 feet, and women's and girls' club room, 16 x 40 feet. On this floor you will also find boys' and girls' individual coat rooms, as well as the office and rest-rooms, all of which are 12 x 12 feet except the latter, which is 10 x 12 feet.

The official opening will occur on February 8, when dedication exercises in keeping with the importance of this occasion will be held. There is certain to be a very fine program of athletic events in the new gym, and the rooms of the various organizations will be decorated to display the type of work that is to be done in them to the best advantage.

NEW STRATHMORE COMMUNITY HOUSE

Howard Smith Mill Adds New Boiler Plant

Further Increase In Boiler Capacity of Cornwall Division Was Necessitated by Rapid Expansion During Recent Years—New Unit Affords Substantial Reduction In Cost of Steam Delivered to Mills Over Previous Steam Cost—Provision For Two More Units

Rapid growth of the Cornwall Divison, Howard Smith Paper Mills, Ltd., in recent years, necessitated an increase in boiler capacity to take care of the extra steam burden. Formerly steam was generated in a boiler house built in 1920 which consisted of six 313 hp. Goldie-McCulloch water-tube boilers fitted with Dutch ovens and Coxe chain grate stokers. The fuel used in this plant is No. 3 buckwheat.

Some four years ago, only four of the six boilers were kept on the line at a time. Two years ago, the completion of a 50 ton soda mill, the Canadian Cellulose Company a subsidiary of the Howard Smith Paper Mill, Ltd., necessitated putting another boiler on the line to meet approximately half the new mill's steam requirements, the balance being supplied by its Wagner furnaces and waste heat boilers.

The addition last year of a forty ton, 154 inch Fourdrinier machine to take care of the heavy increase in demand for the company's bonds, books and other papers brought the steam demand up to the maximum capacity of the boiler house and it was decided to increase the boiler house by the addition of an 848 hp. pulverized fuel unit to the westerly end of the existing boiler plant. Work was started on this unit last autumn and completed this spring.

To prevent interruptions from lack of steam during the construction period in which the steam demand would reach its maximum in mid-winter, a third Erie City boiler unit was installed in the Canadian Cellulose Company's recovery boiler house; but fitted with a Dutch oven and oil fired. The installation of the third unit was originally planned when the mill was designed and its installation fitted in conveniently at this time. Since starting up the pulverized fuel unit in the spring, the oil fired Dutch oven has been removed, and a third Wagner furnace installed.

The designers of the new boiler house were McClellan & Junkersfeld, of New York City. In the design of the new plant, provision has been made for future expansion.

As the steam demand increases above the capacity of the old and new plants, a second and then a third unit will be added to the west of the present one, bringing the rated capacities up to 1878 and 2544 boiler hp. Ultimately the old plant will be replaced by two further units occupying the ground on which it now stands.

Construction of the new boiler house was carried out by the Deakin Construction Company of Montreal, the Dominion Bridge Company supplying the steel. The boiler, which is of the cross drum type suitable for a pressure of 400 lbs. was built by the Babcock-Wilcox and Goldie-McCulloch Company of Galt, Ontario.

The boiler has its Bailey water-cooled walls of the waffle plate type. Pulverizing of the fuel is carried out by either of the two or both of the Fuller-Bonnot mills located in the basement. So far, it has only been found necessary to operate one mill for the two Bailey-Tenney burners when operating up to 340 per cent of rating and delivering 96,000 lbs. of steam per hour.

Preheating of the primary and secondary air is done in a Sturtevant preheater, the air being delivered to pulverizers and furnace at about 370° F. from an outside temperature of 70° F, with exit boiler temperatures of 580° F. The flue gases pass downward through the preheater to the induced draft fan and thence through the breeching in the basement, to the stack of the old boiler house. The induced draft fan is driven either by a 75 hp. motor or 64 hp. Terry turbine. Forced draft is supplied by a Sturtevant No. 80 double inlet fan of 30,000 C. F. N. capacity driven by a 60 hp. motor.

Feed Water Treating Plant

In the selection of a feed water treating plant, a hot process lime and soda softener was chosen having a capacity to meet the ultimate installation of five 848 hp. boilers. The equipment was manufactured by the Cochrane Corporation and provided for the treating of 24,000 U. S. gallons of raw water per hour and the additional heating of 12,000 U. S. gallons of condensate per hour.

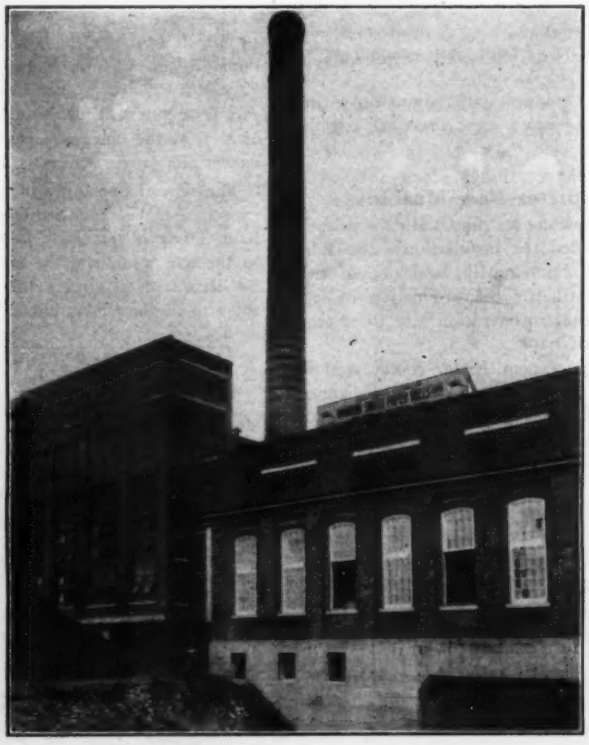


FIG. 1.
New boiler house

The feed pumps, which are located in a separate room in the basement next to the pulverizer room, consist of a four stage centrifugal pump turbine driven with head suitable to a boiler blow-off pressure of 200 lbs. and a capacity of 400 U. S. gallons per minute; a three stage turbine driven pump (formerly in the old boiler house) capable of delivering 260 U. S. gallons against a head of 575 ft.; and finally, twin boiler feed pumps each with a capacity of 60,000 lbs. per hour. These last are also taken from the old boiler house and are only for use as a secondary standby. Water is fed to all boilers from this plant. In the event of raising the boiler pressure at a future date from 200 to 400 lbs., the feed pumps will have to be replaced by new ones to meet the changed conditions.

The feed water level in the boiler is controlled by two Copes regulators situated at either end of the steam drum, giving two independent feeds through separate feed lines and checks. Coal is delivered by elevator to the top of the building where it is

conveyed over a Merrick Weightometer to the overhead bunker. The coal falls to the mills through almost vertical spouts and its quantity is controlled by hand wheels on the firing floor. The bottom of the furnace is fitted with an Allen-Sherman-Hoff ash hopper.

Operation of the boiler is centralized at the right hand side of the boiler, just in front of it, where a control panel is situated. On this panel is mounted a Bailey Boiler Meter giving steam and air flow, and boiler exit flue gas temperature; a Bailey multi-pointer draft gauge; an Ashton pressure gauge; a two pen Foxboro temperature recorder giving air inlet and outlet temperature of the preheater; a two button control to open or close the boiler damper which is motor operated, the motor of which is protected by limit switches; stop and start push button stations for the forced and induced draft fans; and stop push button stations for the pulverizing mills.

On each side of the panel are drum controllers for the operation of the exhausters situated on the firing floor immediately over the mills. Individual control of the secondary air to each burner is obtained by a damper, hand lever operated, just above the burners in the branches from the main duct.

The engineer's office and the wash room for the boiler house staff are situated on a mezzanine floor adjoining the Cochrane treater. Between these two rooms a test table is provided for sampling the feed water concentration.

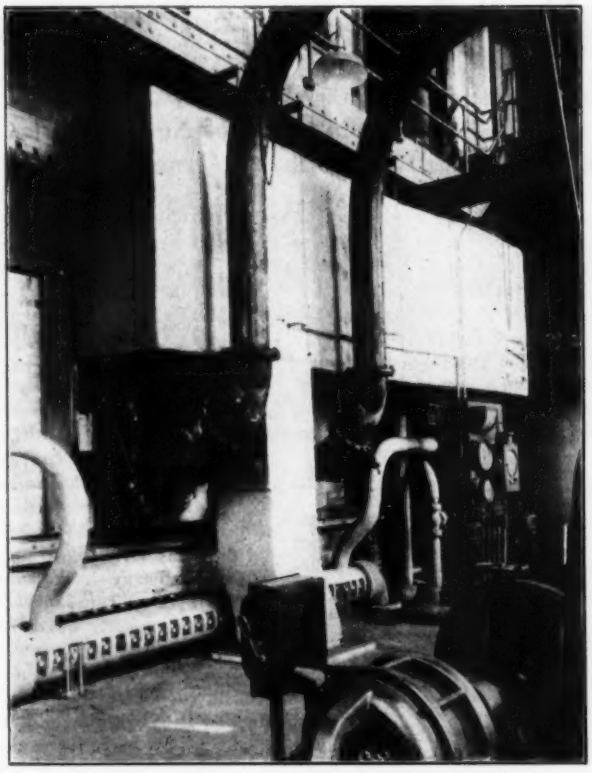


FIG. 2.

The furnace front, showing the two Bailey-Tenney burners. A portion of the Cochrane water softener can just be seen to the right above the second mezzanine floor. The end of its filter can be seen beyond the control panel.

Nova Scotia Slack Burnt

The coal burnt in this plant is Dominion Slack from Nova Scotia which has an average analysis as follows:—

Moisture	3.00%
Dry Basis	
Volatile	35.86%
Fixed Carbon	57.15%
Ash	6.99%
Sulphur	2.88%
B. T. U.'s	13,884

The boiler efficiencies have proved most satisfactory. Daily efficiencies up to 86 per cent are being obtained after four months service, and overall weekly efficiencies varying between 84 and 86 per cent are becoming fairly regular occurrences.

The boiler is carrying from 80 per cent to 90 per cent of the entire steam load, so affording a substantial reduction in the cost of steam being delivered to the mills over the previous steam cost when supplied wholly by the old boiler house where efficiencies were in the neighborhood of 70 per cent to 72 per cent.

Mittineague Power Plant

Contracts have been awarded to the F. T. Ley Company, of Springfield and New York, for the construction of the new hydro-electric power plant at Mittineague, Mass.

When the Strathmore Paper Company purchased the property of the American Writing Paper Company at Mittineague, it considered the most valuable asset obtained in the purchase to be the water power development and rights. During the past two and a half years since the property was acquired, as much use has been made of the water power as the old equipment would permit. Now a complete modern power station will house electrical equipment of the latest design and highest efficiency. The station will be automatic, in that is can be operated from the present steam plant in No. 1 Mill without any attendants on duty in the new station. Although the cost of the new plant will be considerable, the resulting economies will make its construction a really worthwhile investment.

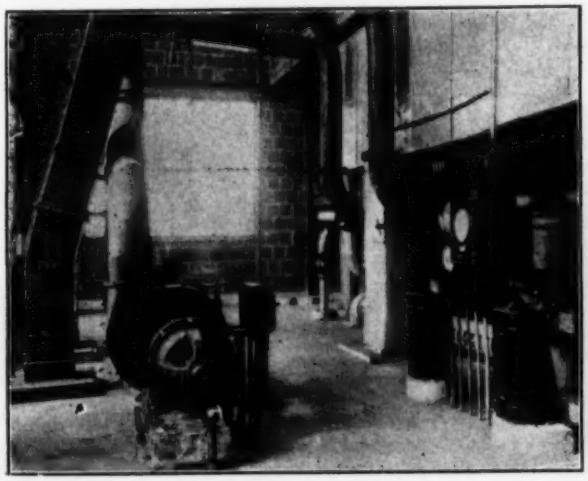


FIG. 3.

Assembly on firing floor in front of boiler.

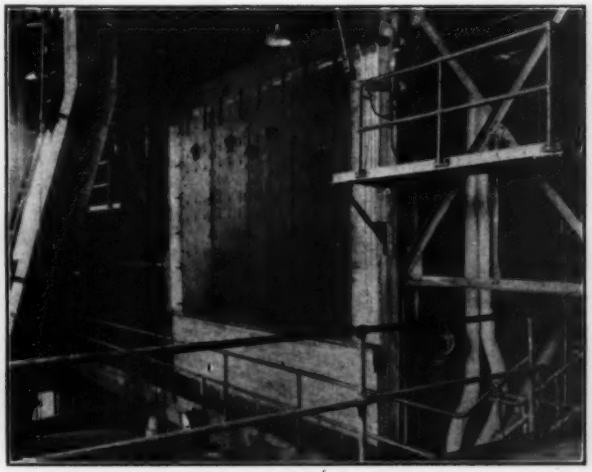


FIG. 4.

The boiler front from the second mezzanine floor

Fraser Co.'s Developments Progressing Rapidly

New Sulphite Mill Under Construction at Atholville, N. B., Will Produce 45,000 Tons of Bleached Sulphite Annually—With Installation of New Machine, Production of Catalog Paper at Madawaska Will Be Doubled—Extension of Digester House

One of the most interesting developments in the history of Canada's Pulp and Paper Industry is without doubt the progress of the Fraser Companies, Ltd., with head office in Edmundston, N. B. From being purely a lumber manufacturing concern the Fraser Companies started its first venture in the Industry in 1917 with the erection of the Edmundston Sulphite Mill. In 1920 they acquired the mill and holdings of the Dominion Pulp Company near Chatham, N. B., and in 1925 their first paper machines were erected, which at the end of 1928 numbered seven and will at the end of this year total eight machines, one in Edmundston and seven in Madawaska.

Pioneering History of Company

The history of this company is typically pioneering in nature. The founder of the company, Mr. Donald Fraser, came from Scotland to Canada in 1873 and settled in the River du Chute district where he built a mill in 1877 for the manufacture of clapboard. In 1894 he took his two sons into partnership and branched out to the Fredericton district. Donald Fraser and his two sons, Archibald and Donald, operated the partnership up to 1910 when they incorporated as a limited liability corporation under the name Donald Fraser & Sons, Ltd. During the partnership and later on after 1910 they acquired holdings and secured controlling interests in other companies which were all merged in 1917 under the name of Fraser Companies, Ltd.

Among the properties now included in the company are the Temiscouata limits in Quebec which were bought up in 1899. The Tobique Manufacturing Company, was taken over in 1903 and was operated by the Fraser interests under the name of Fraser Lumber Company until 1917. In 1905 they founded a branch with some of the present officials of the company which was called the F. & M. Lumber Company, operating lumber mills at Whitworth, near River du Loup, Que.

In 1911 the Murchie and other properties around Edmundston were absorbed and operated under the name Fraser Ltd. In 1904 the Baker Brook Manufacturing Co., was organized operating mills on the upper St. John river.

In 1917 all these interests were merged under the name Frazer Companies, Ltd., and a sulphite mill was erected in Edmundston that year. In 1920 the new company took over the Chatham mill at Miramichi river.

In 1925 the Fraser interests brought the capital stock of the Stetson Cutler & Co., Richards Manufacturing Company, Continental Lumber Company, and others, which interests were all merged to Restigouche Company, in 1928. The Sinclair Lumber Company, at Miramichi River was acquired in 1927. The mill sites of this company are held by the Fraser Companies but part of the holdings belong to the Restigouche Company.

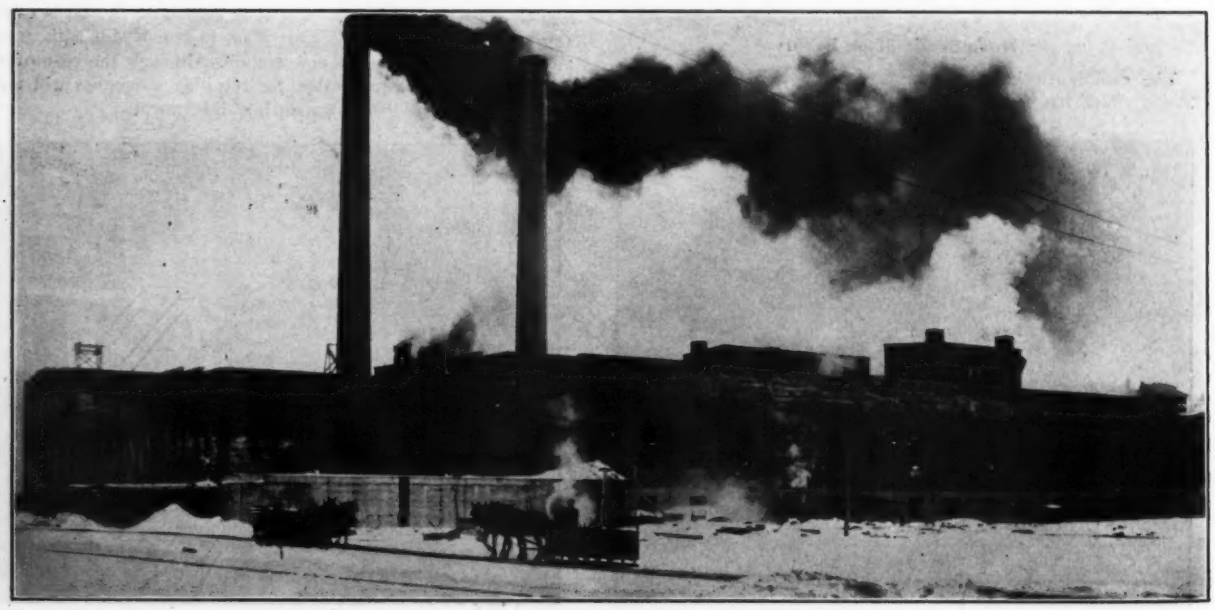
In 1925 the Fraser Paper Ltd. was organized and the erection of the paper mills in Madawaska, Maine, started. This subsidiary, which is completely owned by the Fraser Companies, Ltd., operates all the paper mills owned by the company.

As a fitting climax to the progress of the company a bleached sulphite mill is now under construction on the Restigouche River in New Brunswick by the Restigouche Company, which mill will be ready to start operation January, 1930.

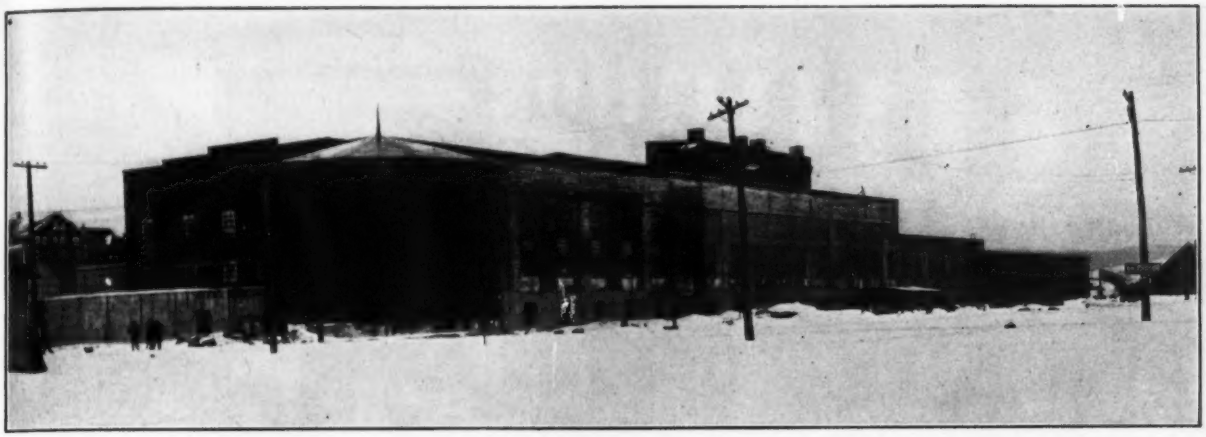
Holdings and Production

An idea as to the extent of the Companies operations and holdings is obtained from the following figures. The timber areas owned and controlled by the company total about 4000 square miles, with an estimated stand of 20 million cords of wood, not including cutting rights on leased lands other than Crown Land leased directly from the Government. The yearly cut for the company's operations averages 700,000 cords.

The total number of employees on the companies' payrolls ap-



VIEW OF THE BOND MILL OF FRASER PAPER LTD. AT MADAWASKA.



VIEW OF THE CATALOG MILL OF FRASER PAPER LTD. AT MADAWASKA.

proximates 15,000. They operate thirteen saw mills, four of which have planing mills and eight operating a total of 66 shingle machines.

The pulp and paper mills include the sulphite mills at Chatham and Edmundston, one ground wood mill ,two board mills, one mill manufacturing catalog paper, and one mill with four machines running on bleached papers.

The annual production capacity of the company is as follows: 160 million feet of lumber, 160 million shingles, 200 million laths, 250,000 railroad ties, 60,000 tons bleached sulphite, 40,000 tons unbleached sulphite, 42,000 tons ground wood, 51,000 tons bond and waxing paper, 51,000 tons board, 20,000 tons catalog paper.

The production of catalog paper will be doubled in 1930 with the installation of another machine.

The new sulphite mill at Atholville will produce 45,000 tons annually of bleached sulphite.

As the reader of this publication is interested principally in the pulp and paper industry the brief description which follows will only cover the pulp and paper mills owned by the company in Edmundston and Madawaska.

Edmundston Sulphite Mill

Three grades of sulphite pulp are manufactured in this mill. A bleached sulphite of highest quality for bond and waxing papers, an unbleached sulphite for catalog and board and a semi-sulphite made from mill waste, sulphite screenings and save-all stock for board filler. The semi-sulphite is made entirely separate from the other grades and has its own wood preparation equipment, digesters, acid system, tank, etc., and is finally refined in rod mills according to newer practice in the manufacture of such type of wood pulp.

All pulpwood used in the sulphite mill and ground wood mill is barked in Thorne's barking system built by the Canadian Allis-Chalmers Ltd., and consisting of two units three pockets each 4 feet 6 inches wide to 4 foot wood, 60 cords per hour has been barked in this system.

The wood is either piled or taken directly to the mills and is given a final washing in a drum 9 feet 6 inches by 30 feet. The wood is taken by a sorting conveyor to a pond and from there fed to the chippers. Rejected wood is rossed on six rossers built by the Smith Foundry in Fredericton, N. B.

The chippers are of Waterous make with 80 inch discs, four knives revolving 175 revolutions per minute. The chips scheens are Waterous reciprocating flat screens, the coarse screen having openings 1¼ x 2½ the sawdust screen 5/32 inch holes. The oversized chips are crushed in a crusher and returned to the screen. The sawdust is burnt in the boiler house. The raw material for the semi-sulphite is chipped and screened in Waterous equipment.

The acid-plant consists of three rotary sulphur burners 4 feet by 10 feet. Four acid towers 9 feet in diameter inside the lining and 84 feet high are used Of these, two towers with necessary coolers produce acid for the semi-sulphite and the other two make acid for the standard grades.

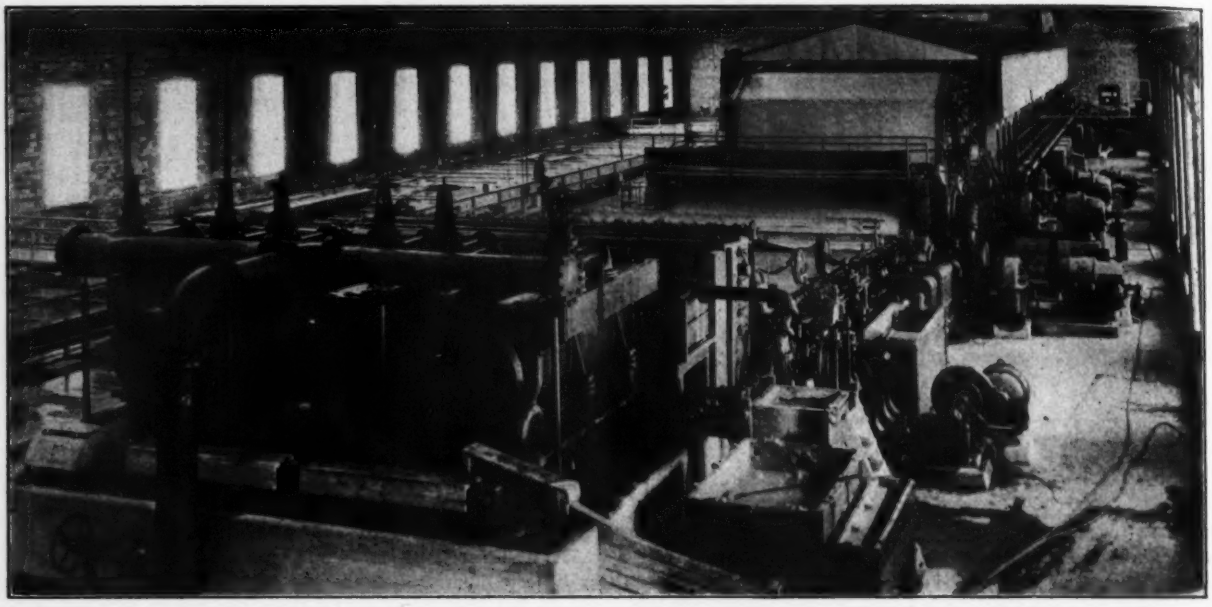
The digester house contains eight digesters 17 feet by 56 feet, two of which are used for semi-sulphite. The decker process is used for cooking and no relief coolers are used. The latest extension of the digester house was made in 1928, at which time the John Inglis Company, Ltd., built two digesters and the steel structure for the extension was put up by the Dominion Bridge Company, Ltd.

All digesters are equipped with Hydraulic Machinery Company 10-inch blow off valves. The blow pits are rectangular concrete tanks 20 feet by 60 feet with perforated bottoms made of long leaf yellow pine planks. The perforation is ⅛ inch.

The stock from the blow pits is pumped to eight knotters made by the Sherbrooke Machinery Company. Two of the knotters run on semi-sulphite and all have ¼ openings. From the knotters the stock flows over rifflers and is pre-screened in nine centrifugal screens with .055 inch opening, some of Sherbrooke and some of the Westbye makes. The rejected stock from the screens is rescreened in one centrifugal screen and the accepted stock is rescreened on 24 twelve plate flat screens of the Waterous make. Part of the screened unbleached pulp is pumped to the paper mills at about ¾ per cent consistency and the balance is dewatered in four cylinder deckers 42 inches in diameter and 128 inch face. From the deckers the pulp is dropped in a V-Chest which supplies the bleachers with stock.

The semi-sulphite is run over two of the knotters and two Bird screens with .075-inch openings supplied by Canadian Ingersoll Rand Company. The accepted stock from the screens is used directly as is either in the Edmundston boardmill or is pumped to Madawaska at .6 per cent consistency. The knots and screenings from the entire sulphite mill are refined together with save-all stock in two Hardinge rod mills 6 feet by 12 feet in series. The rod mills have each 20 tons 2 15/16 inch rods made of carbon steel.

The bleach plant consists of ten five ton Bellmers where the stock is bleached to a 90 per cent color. The bleach is prepared from liquid chlorine supplied by the Canadian Salt Company, and hydrated lime from the Restigouche Company. The bleached pulp is washed on three cylinders 36 inches in diameter and 100 inches long. The bleached stock is screened on 24 twelve plate flat screens with .009 cut plates.



CATALOG MACHINE AT MADAWASKA SHOWING BACK OF MACHINE, DUPLICATE OF WHICH HAS BEEN ORDERED.

All bleached stock is pumped to the Madawaska paper mills through a 17 inch wooden stave pipe at .8 per cent consistency.

For pumping the stock a 10 inches by 8 inches S.S.O.R. Canadian Allis Chalmers double suction pump is used running 1200 revolutions per minute with a capacity of 400 gallons a minute. The diameter of the impellor is 14 inches and the pump is driven by a 75 h.p. directly connected motor.

Ground Wood Mill

The grinder equipment consists of five lines of Waterous three-pocket grinders each line consisting of four grinders with 27 inch by 53 inch stones. Each line is driven by a Westinghouse motor 2400 hp. 6600 volts 240 R.P.M. Two Pascal Bull screens and four Waterous fine screens are used for screening the pulp.

The grinders are equipped with the Ross Engineering of Canada, Ltd., vapor removal system. The screened pulp is deckered on two United Filters supplied by John Bertram & Sons Company, Ltd. The vacuum pumps are Connersville pumps, the centrifugal pump Worthington's and the plunger pumps are Gould's Triplex type. Texrope drives are used on all the screens and Westinghouse motors are used exclusively. Two grades of ground wood are made, a No. 1 grade for catalog and a coarser No. 2 grade for board.

Edmundston Board Mill

With the starting up of the two first paper machines in 1925 and 1926 one of the drying machines used in the sulphite mill became idle. This machine was rebuilt during 1926 for the manufacturing of board and was further improved during 1928 to handle a larger production. This unit now consists of four 1300 pound beaters and three Waterous Jordans used for processing the stock. The machine was rebuilt by Charles Walmsley & Co., Ltd., and is equipped with six cylinders. Six Bird screens supplied by the Sherbrooke Machinery Company, Ltd., are in use. The drivers have 132 inch face and the machine makes a sheet 120 inch trim. The drying machine is driven by a Walmsley engine. Two Farrel stacks, Cameron rewinder, Hamblet board cutter and two Seybold trimmers complete the equipment in this plant.

An interesting feature of the Fraser Companies' plants is that the pulp mills are located on Canadian soil while the paper mills are across the boundary in the United States, exactly one mile apart but that despite this fact, they are connected together by pipe lines. The boundary at this point is the Saint John River and the pipe lines are fastened on to the International bridge crossing the river.

Separated Into Three Groups

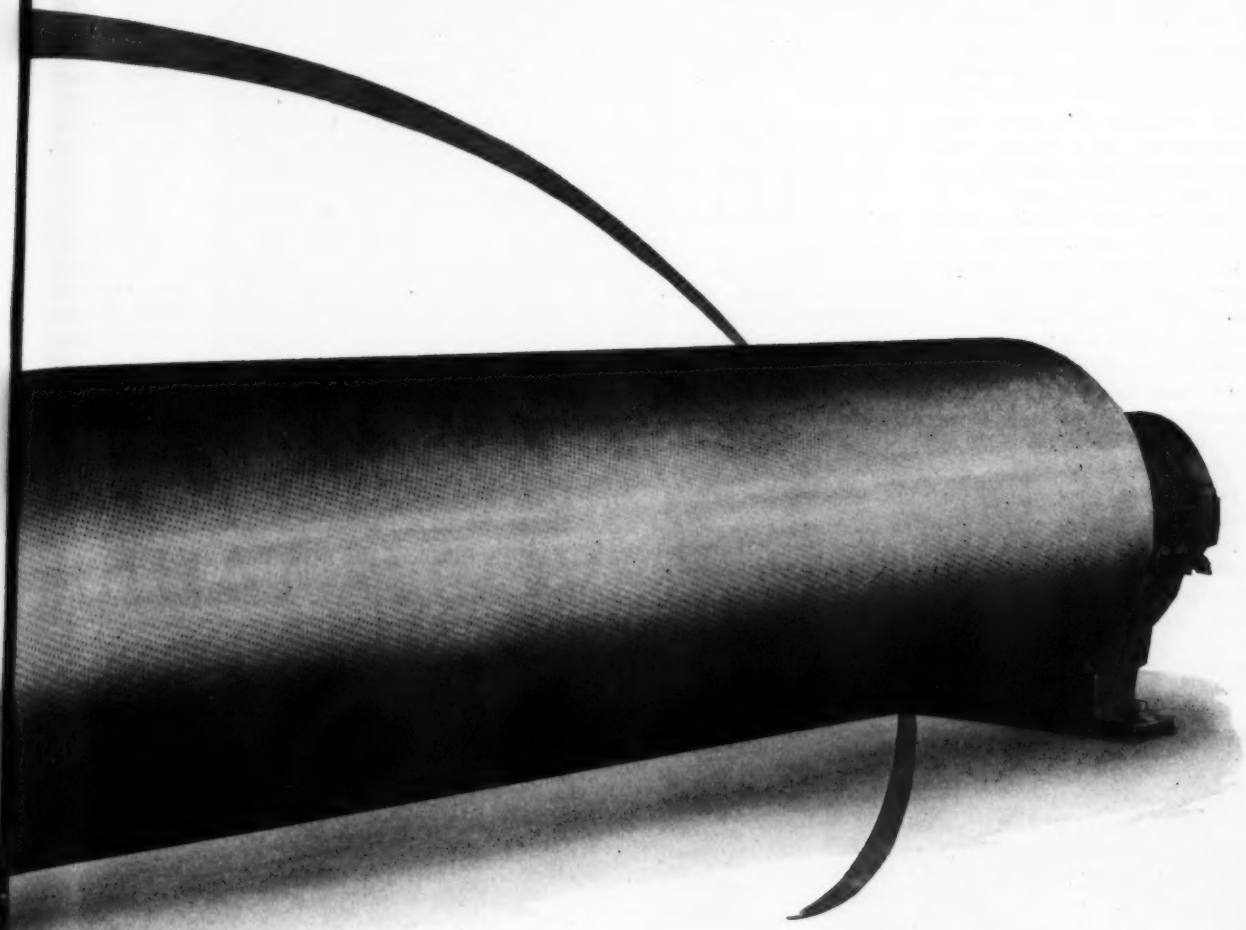
The paper mills are separated into three groups, the bond mill, the catalog mill and the board mill. The bond mill is using bleached sulphite only and manufactures white and colored bonds, waxing and bleached specialties. The catalog mill is running on catalog paper for Sears & Roebuck and is using No. 1 ground wood and unbleached sulphite. The products made in the board mill consist mostly of test liner, single and double manilas, ice cream stock, pie plate, bleached lined stock, etc., containing bleached and unbleached sulphite, ground wood and semi-sulphite.

All the stock is slushed to these mills as mentioned before and the mills are therefore being supplied with water at the same time. The stock is deckered on Oliver and American filters and the white water from the filters used as water supply. All white water from the paper machines is run over the same filters and the fibers in the white water are returned back to the system with the good stock. Surplus wire pit water from the bond mill considered too dirty to be returned to the bond mill system is run over a Bird Save-all in the board and the stock used into the board filler.

Attention is paid to uniformity of stock to the various mills and large storage tanks are available where the stock is well mixed before it reaches the respective mills. There is for instance a 50 ton tank for bleached sulphite, one of similar size for unbleached and a 100 ton ground wood storage tank, from which the mills draw their supply of stock.

The bond mill is also equipped with a bleach plant where a portion of the bleached sulphite is given an extra bleaching. This superbleached sulphite is used in water-marked bonds of highest quality.

The equipment used in the various paper mill units are as follows:



Downingtown (Kilberry Type) Suction Roll with Adjustable Suction Box Packing and Deckles. ~ These adjustments made from front side, while running. ~ Information on request.

DOWNINGTOWN MANUFACTURING CO.
Downingtown, Pa.

Bond Mill Equipment

The deckering and Save-all equipment consists of four deckers and two Oliver Filters 8 feet 1 inch in diameter, 12 foot face with 20 foot barometic leg. Fifteen Dayton beaters of 1300 pounds capacity supply stock to the four paper machines. Jones Jordans and Claflins are used for refining.

No. 1 machine, a Pusey & Jones, trimming 154 inches equipped with Voith's inlet and Millspaugh suction couch and first press is producing colored bonds and specialties. The drying system is by Broughton. One Farrel stack and a Cameron winder are used. A Dorr tank 18 feet in diameter is used as part Save-all. All white water when running colors is run over a Bird Save-all and the stock is immediately returned to the system. No. 2 machine is identical with No. 1 and runs on waxing paper.

No. 3 machine is another Pusey & Jones with 202 inch wire equipped wire three Bird screens, a Millspaugh suction couch, three pressed and a smoothing press. The Fulton drying system with Pickles' regulator is used. Two Farrel stacks and a Cameron winder are the auxiliary equipment. This machine runs on high grade watermarked bond and ledger.

No. 4 machine is also a Pusey & Jones' make with 196 inch wire equipped with a Voith inlet, Millspaugh suction couch, two presses and a smoothing press. The machine is built for a speed of 1000 feet per minute on light weight waxing. The Fulton drying system and Pickles' regulator are used.

All pumps are Goulds' and the paper machine drives are the Harland drives. Westinghouse motors and electrical equipment are used throughout the bond mill. For broke beaters three Midwest beaters are used.

The finishing room contains two hamblet cutters and three Seybold trimmers.

The bleach plant consists of two vertical high consistency bleachers 10 foot diameter by 20 foot high of the Fletcher type. The capacity of these bleachers is about 4 tons. A Valley Iron Works screw press brings the stock to a consisency of about 16 per cent. Two Valley Iron Works washer sections wash the stock and a Gould Triplex pump supplies the stock to No. 3 machine.

Catalog Mill

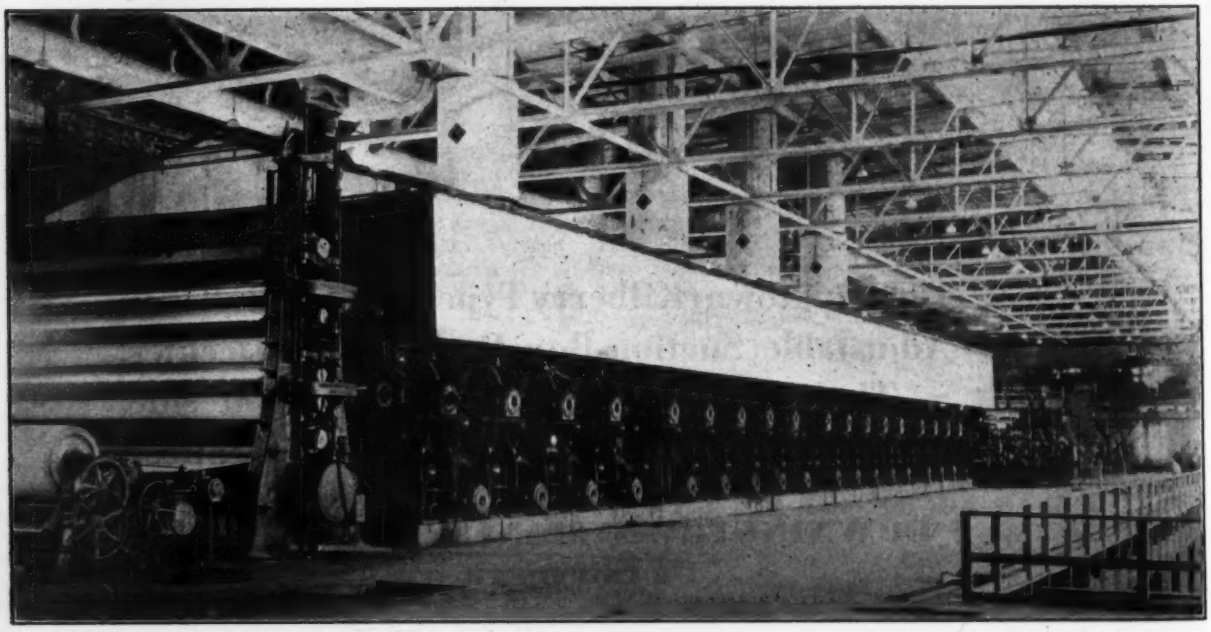
The filtering and Save-all equipment consist of one 10 disc United filter of 50 tons capacity for ground wood and one combination 11 discs United Filter for 50 tons ground wood and 35 tons of sulphite. Two Dilts 2400 pound beaters and two E. D. Jones Jordans refine the pulp. A Gould fan pump pumps the stock to the paper machine. The paper machine is a Pusey & Jones, equipped with three Bird screens and a Voith inlet. The wire is 224 inches wide and the machine is built for an average speed of 1000 feet. Millspaugh suction couch and first press are used, also the Fulton drying system and the Pickles steam regulator. A Farrel stack, a Pope reel and a Cameron winder complete the machine. A Midwest beater equipped with a Griley-Unkle Extractor is used for broke beater. The clay handling equipment is supplied by the Jeffrey Manufacturing Company, and mixing tanks and agitators by the Hill Clutch Machine and Foundry Company.

Madawaska Board Mill

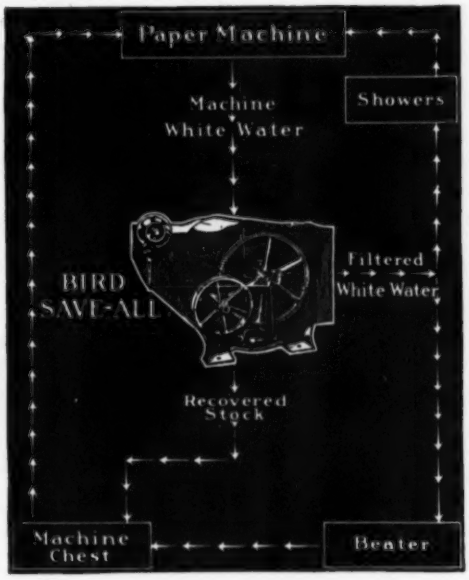
The deckering and Save-all equipment in this plant consists of two 10 disc United Filters for ground wood with 50 tons capacity each and one two disc filter of the same make for semi-sulphite. The beating equipment consists of six Midwest beaters and four Jones Jordans. The Harvey Llewellyn paper thickness control system is used. The machine is a seven cylinder, 148 inch face and the drying section the Black-Clawson Company, vertical system five decks high and with 110 dryers. Two Farrel stacks and one Moore and White cutter and winder are used. The machines is driven by a variable speed Westinghouse motor and the maximum speed of the machine is 350 feet a minute. The Fulton drying system is used for condensed water removal.

Buildings for New Units

All buildings for the new units are erected of interlocking brick face tile 8 inches deep and the roofing is Lathrop Hodge gypsum roofing. Heating and ventilating systems are supplied by the Ross Engineering Corporation including Briner economizers for all machines. Piping and fittings are supplied by



CATALOG MACHINE FROM DRY END AT MADAWASKA PAPER MILL, DUPLICATE OF WHICH HAS BEEN ORDERED.



HERE IS A SAVE-ALL SYSTEM THAT RECOVERS ALL THE FIBRE

Complete recovery with simple equipment gives you a greater profit . . .

The Bird Closed System of White Water Treatment gives you every quality you are looking for in a recovery system. Check these features against your requirements:

SIMPLICITY

The Bird System calls for only one piece of new equipment: the Bird Save-All, a simple device, completely automatic. The Bird System needs no attention beyond an occasional inspection.

EFFICIENCY

The Bird System recovers all the fibre. All white water goes to the Bird Save-All. From the Bird Save-All, the recovered fibre goes to the machine chest. The filtered water, clear but still carrying a small percentage of valuable fibre, goes to the beaters and showers. Recirculation gives the Bird Closed System an over-all efficiency of 100%.

HIGH NET PROFIT

Because of its moderate first cost, its negligible expense for power and maintenance and its high efficiency, the Bird Closed System of White Water Treatment pays a high net profit. It recovers all the fibre and recovers it at the lowest possible cost per pound.

May we suggest a layout for your mill? You will be under no obligation whatever.

BIRD MACHINE COMPANY
SOUTH WALPOLE ▲ MASSACHUSETTS

3449

the Crane Company, and all stock lines and white water lines are made of copper tubings.

Steam Plant

The steam plant consists of two 690 hp. and three 1000 hp. Badenhauser boilers built for 250 pound pressure. Lupulco pulverized coal system is used. The coal pulverizing system contains two fifteen tons and one seven tons per hour Raymond pulverizers with necessary blowers, hoppers and conveyors. The Cochrane feed water heater and deaerator is used. Two stacks 235 foot high and 12 foot diameter at the top are supplied by the Heine Chimney Company.

Power Plant

Power for the Madawaska paper mills is generated from steam in three Westinghouse turbines, 2500, 3400 and 7500 K. W. each. Practically all electrical equipment throughout the plant is of Westinghouse Electric and Manufacturing Company's make.

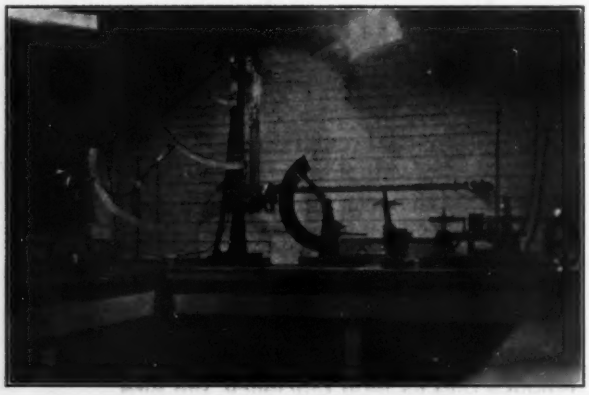
Operation and Quality Control

Although relatively new in the paper industry the Fraser Companies, Ltd., has given considerable thought and spent much money on technical control of its products. The operation is checked and controlled right through from the chip to the finished paper and not a pound of paper is allowed to leave the mill without being inspected for quality.

Besides seven testing stations around the various plants the company maintains two well equipped laboratories, one in Edmundston and one in Madawaska. The staff of the control department consists at present of thirty members. Both laboratories are equipped with constant humidity room for both pulp and paper testing.

Testing Methods Developed

Many original testing methods have been developed in the companies' laboratories, among which might be mentioned the now well-known chlorine number method for control of cooking



EQUIPMENT FOR CONTROL AND QUALITY TESTS.

and bleaching and for the determination of lignin and sulphite content of catalog and news print paper. The tentative standard method for determining initial strength of pulp at present adopted by the industry was partly originated in the companies' laboratories and is used as check and control of the pulp and the various steps in the paper manufacturing process.

The ground wood is controlled for freeness, drainage, strength, etc., and kept within very specific limits to insure a uniform sheet of catalog paper.

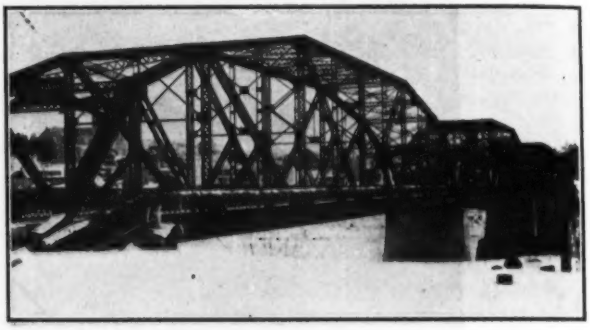
The paper and board are controlled and inspected for properties required in the different products.

Finish, opacity, density, sizing formation, etc., are properties which are essential in catalog paper and which are checked and controlled twenty-four hours per day.

Bond is tested for fold, bursting, tearing, sizing, finish, etc., and the waxing is checked for all these qualities and in addition for special properties such as bulk, wax absorption, etc.

All board products are checked for weights, caliper, moisture, water proofness, and other properties.

All paper and board made is inspected before shipping and compared with standards and order specifications for the various grades, and any paper below standard or not up to specification in any respect is culled out. In this way only the company can



INTERNATIONAL BRIDGE SHOWING PULP PIPE LINE

be certain that they are supplying the trade with a product satisfactory in all cases.

Organization of Company

The officers of the company are: Archibald Fraser, president; Donald Fraser, vice-president; A. W. Brebner, treasurer; and W. Matheson, secretary.

The board of directors include beside the above mentioned officers, Donald A. Fraser, Jr., W. C. Pitfield, J. H. Price and G. H. Mead.

The General Manager of the companies' pulp and paper manufacturing is F. P. Lyden.

Towns of Edmundston and Madawaska

In conclusion, a word might be said about the towns in which the pulp and paper plants of the Fraser Companies Ltd., are located. The country surrounding the two towns was in the early days the headquarters of an Indian tribe called the Malecites and was at that time known as Madoueskak from which name Madawaska originated. Colonization of the present towns began in 1785 by the Acadians and Canadians and after 1830 the progress of the town was rapid.

At the time in 1917 when Fraser Companies built their first mill in Edmundston the population did not exceed 1800, but has since reached 7000. The area of the town is one and a half square miles. Edmundston is to-day a prosperous up to-date town. It is served by three railroads, Temiscouata, Canadian Pacific and Canadian National Railways, being a divisional point of the latter. There are three churches, Catholic, Anglican and United, and three large public schools attended by over fifteen hundred children. Five excellent hotels are available. Fraser Companies operates a dairy, retail store, and numerous other enterprises around the town for the convenience of the town people. There are two up to date theatres both equipped for sound pictures.

The town of Madawaska across the Saint John River contained prior to 1925 only a few houses, mostly retail stores serving the surrounding farming country. With the erection of the paper mills this town grew very rapidly and has to-day a population of over 2000. There is a large public school and a Catholic church. Excellent stores and theatres serve the population.

Established 1886

WOOD PULP SERVICE

Our clients' needs are carefully considered and our advice is based on a constant study of the world's Wood Pulp markets. Our customers are therefore assured of maximum value at minimum cost.

Regular shipments of large tonnage enable us to give SERVICE in all grades and if you contemplate buying Bleached, Easy Bleaching or Unbleached Sulphite, Kraft or Ground Wood, we can make favorable offers for prompt or contract shipment.

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Of Every Description

M. GOTTESMAN & COMPANY

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Champion Coated Builds Huge Power Plant

System Now Being Installed at Hamilton Will Reduce Electric Current Cost For Paper Mill Use Below Water Power Production Cost—Modernization of Entire Mill In All Departments Being Carried Out By Engineering Staff—Paper Machine Improvements

Champion Coated Paper Company, although established nearly fifty years ago, is a modern mill operated by a management with progressive ideas, constantly planning up-to-date installations of equipment which have placed the mill on a plane of operation that is efficient and thorough in every detail.

Of particular interest is the power plant which is now being constructed. It will reduce the cost of electric current, for paper mill use, below the cost of production by water power. The paper industry is especially interested in this revolutionary feature of the Champion program, now being installed at Hamilton and designed by Champion research and engineering departments.

The building will be of brick construction, approximately 100 feet high, immediately adjacent to the present plant, and will be tied in with the old plant which will be held as stand-by equipment. The steel for the building and boiler will be furnished and erected by the Massillon Bridge and Structural Company, of Massillon, Ohio. The F. K. Vaughn Building Company, of Hamilton, Ohio, have the contract for the entire building construction and were responsible for sub-letting the contracts for steel, sash, roofing and other general construction work.

The project will include one 27,000 square foot Babcock and Wilcox cross drum boiler capable of producing 350,000 pounds of steam per hour at 650 pounds pressure, 750 degrees total temperature, when operating at 400 per cent centennial rating. The outline dimensions of the boiler are approximately as follows:

35 feet square by 80 feet in height, which is the largest boiler yet built to operate at a pressure of 650 pounds.

The unit system of pulverized coal firing will be used employing four No. 5 duplex Riley Atrita mills. The furnace will have a fraction cold of 60 per cent, the water wall surface being about 2,600 square feet. Preheated air temperatures of 500 degrees will be obtained at a maximum rating through a 47,000 square foot tubular air preheater.

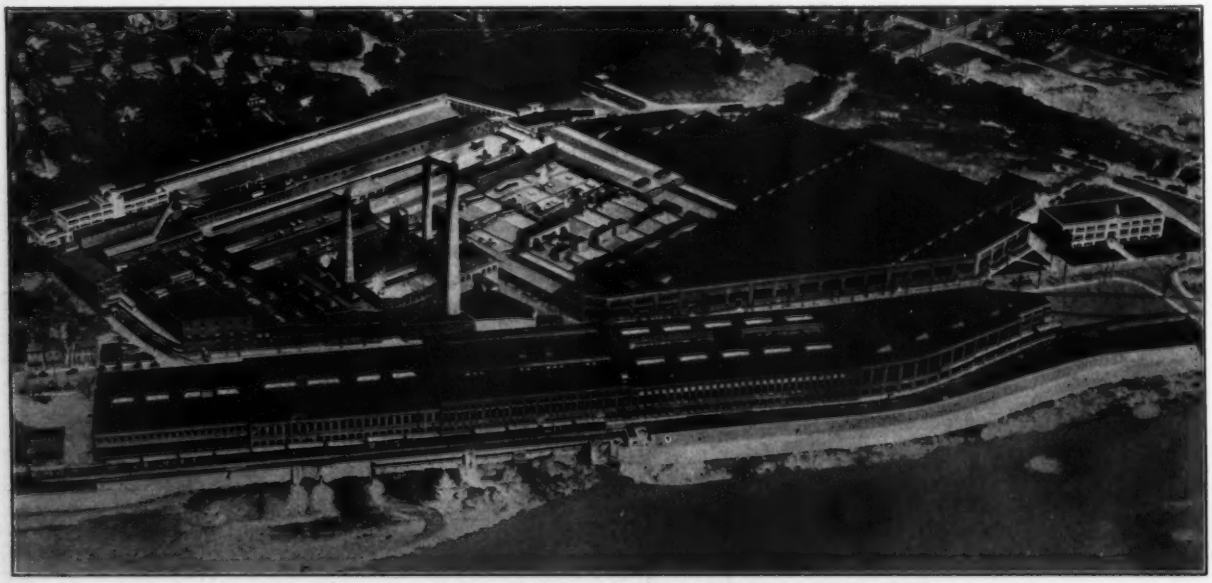
The regenerative cycle feed water heating will be used. Feed water will be heated in four successive stages, viz:—30 lb. absolute, 80 lb. absolute, 190 lb. absolute, and finally passes through a heat exchanger absorbing heat from the continuous blowdowns. The feed water will enter the boiler at 370 degrees Fahr. To maintain low concentration in the boiler five per cent to six per cent of the total boiler feed water will be blown down continuously.

Pumps Driven by Turbine and Motor

The feed water pumps will be driven by both a turbine and a motor. Under usual conditions of operation the electric drive will be used. The turbine will be carried along by the motor with its governor so arranged that four per cent speed variation in the motor will cause the turbine to restore a normal speed. The motor and turbine will be rated at approximately five hundred hp. each, emergency operation requiring about 750 gallons per minute against 1800 feet head.

The steam will be expanded to 30 lb. absolute through a 15,000 Kw., cross compound turbine, to be built by the General Electric Company. The 7500 Kw. high pressure element will expand the steam to 215 lb. absolute, and a 7500 Kw. low pressure element will continue the expansion to 30 lb. absolute. A non-automatic bleeder connection for feed water heating and mill process supplies steam bled from the low pressure unit at approximately 80 lb. absolute. For summer operation a third unit, a 1500 Kw. low pressure condensing turbine, will continue the expansion from 30 lb. absolute to two inches mercury absolute. This, as previously mentioned, will be required to maintain the balance between electrical energy and process steam demand.

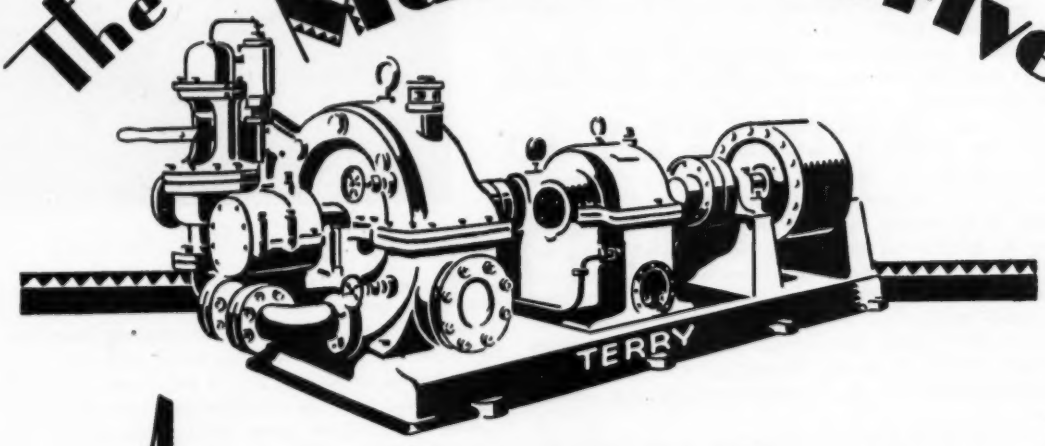
The high pressure element is eight stage, non-condensing; the low pressure element is six stage, non-condensing, each machine occupying floor space of 270 square feet. The closed system of



AERIAL VIEW OF CHAMPION COATED PAPER CO. PLANT

At the present time there are two additions being made—the new power plant and an addition to the coating mill finishing room, which already is the largest paper finishing room in the world.

The Terry Paper Machine Drive



Again Selected for its FLEXIBILITY

An eastern paper manufacturer was employing a system of drive on his paper machines which, while satisfactory in many respects, did not give the exact speeds required. The drive was so constructed that the paper speed had to be increased or decreased in steps of 50 ft. per minute. At the same time it did not give the desired speed range.

He has now installed a 75 HP Terry Paper Machine Drive to replace his previous system. He is thereby able to obtain the exact paper speed required, and also a much wider speed range.

The Terry drive permits the operation of a paper machine at any speed between specified limits. An increase or decrease in speed is made at a uniform rate. The speed range can be any value up to 10 to 1 or higher.

Ask for Bulletin S-89.

The Terry Steam Turbine Company

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generator ventilation will be used. Raw well water will be introduced into the air coolers on its way to a hot process lime and soda water treating plant.

Modernization of the entire mill in all departments, as well as the power plant, has been the object in mind and which is constantly being worked out with the minimum amount of shut-down to operation. This work is being carried out by their own engineering staff who deserve much credit for the efficient manner in which it is done.

Large Concrete Chest Installed

During the past year several installations of importance have been made which are directly a part of the paper machine itself. In their No. 2 mill, where are three 150 in. machines and one 138 in. machine, it became advisable to replace the old wood beater room stock chests. Preliminary investigation found it necessary to shut down each machine for a period of two weeks, at least, to tear out the old wood chest and replace with a larger one of concrete. As there was no place available of sufficient size, it was not possible to build a chest in another location while the old one could be kept in operation, nor would it hardly be practical to do so. This situation had to be overcome as business at any time will not warrant a two week shut-down of any one of the eleven paper machines. After considerable discussion, the solution of this problem was to build a concrete chest around the old one while it was running. A new agitator shaft was made in the machine shop during the week and was ready to install on Sunday. On Sunday while the machine was down, and the chest empty, the bearings and drive were moved apart enough to make room for the concrete ends of the new chest. On Monday morning the old chest was ready to go with its new shaft.

During the following week excavation was made around the old chest bottom while it was running, and within the next week the carpenters formed up the chest, concrete was poured and allowed to set. The following Sunday, the old wood chest was torn out and the result is pictured in Fig. 1.

Paper Machine Line Shaft Drives

The problem of correct drives on various applications is another phase of the work which has had considerable thought. The coristant speed line shafts of all the paper machines are now

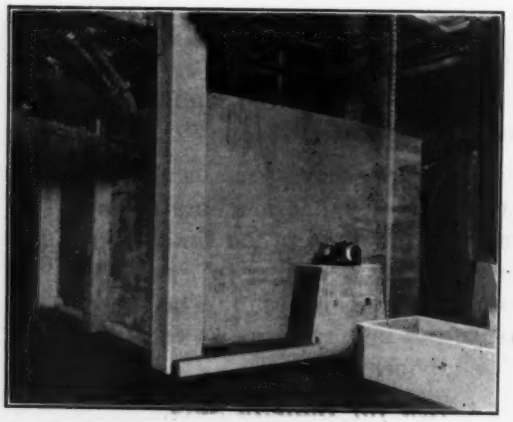

FIG. 1

individually motor driven, the work having been completed a month or so ago. Plans are now being developed whereby ten variable speed engines driving the dry end of the paper machines will be replaced with direct current motors. This change is to be completed about March 1, 1930.

Multiple "V" Belt Drives

On drives where they are adaptable, much use has been made of the multiple "V" belt which operates on very close centers. An example of this type of drive is on the couch suction roll and flat box vacuum pumps for the No. 1 mill paper machines, each pump with its electric motor. By the use of the "V" belts, and

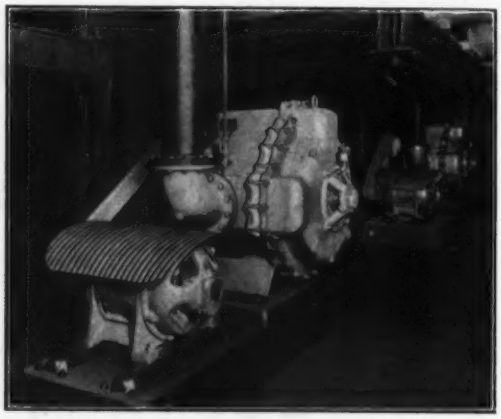

FIG. 2

by mounting the motor beneath the suction pipe, the pump and motor take up very little more space than the pump alone, and at the same time, all parts of the pump and motor are accessible for inspection and maintenance work. (Fig. 2).

The pumps on Nos. 1, 2, 3, 4 and 5 paper machines are in a dead line and each has a straight pipe from the suction roll connection above to the pump below. All electric wires to the motors are in conduit and concealed in the concrete base and floor. Starters are placed easily accessible on the columns by the pumps.

Enclosed Gear Drives

A common drive seen in nearly all paper mills is the wood tooth bevel gear which is used to drive the various parts of the paper machines. These are dangerous, noisy, and require considerable maintenance. Enclosed gear drives of both the spiral bevel and

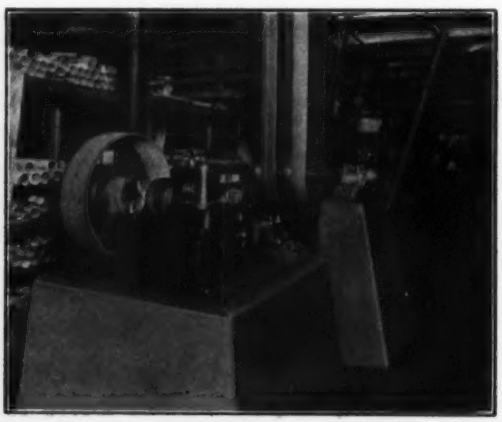

FIG. 3

worm types have taken a prominent part in the replacement of the wood gears. Installations of the enclosed type have been placed on paper machine dryer drives, reels, machine calender drives, etc., and have proven very satisfactory. (Fig. 3).

One machine is now being completely equipped with the spiral bevel type machine drives from couch roll to calenders. The corner stand drive at the end of the variable speed shaft in the

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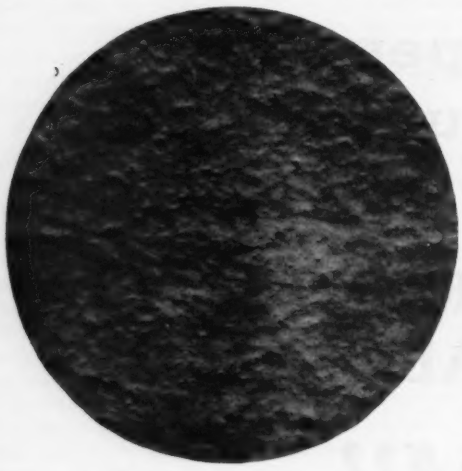
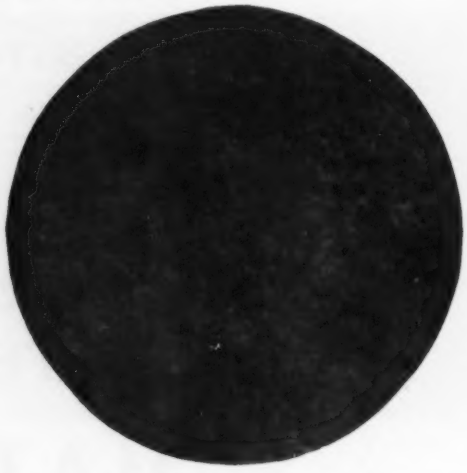
basement is being replaced with a worm gear drive similar to the one shown in the accompanying illustration. All variable shafts in No. 2 mill have been equipped with this worm gear and the resulting cleanliness, quiet, and safety is so desirable that they have been approved for installation on all machines in the No. 1 mill.



Micro-photograph enlargement of the surface of best enamel made five years ago.



Micro-photograph enlargement of the surface of the lowest grade sheet produced today at this mill.

Water Supply Pumps

In No. 2 mill machine room basement was a pump installation, the arrangement of which did not equal the standard set in the program of modernization. The pumps were rearranged, piping was placed overhead, and the motors were directly connected to the pumps. Space is also provided for a future installation, should it be found necessary. (Fig. 4).

The 2300 volt control equipment is completely enclosed by expanded metal and the top is hooded so that condensation from overhead cannot short the equipment and endanger the operator. On the wall to the left is the new group of safety switches for light circuits, with the wires leaving in metal conduit. This is a view of but one of the many installations where employees' safety has been considered as well as efficiency of the equipment.

The entire main mill water supply pumping equipment has been recently rearranged for better efficiency. Three of four original Allis-Chalmers, direct connected, motor driven pumps were entirely rebuilt in the Champion's own machine shop and a new DeLaval pump of the same capacity was purchased and installed as shown in the illustration. These pumps take water from a basin directly underneath them and deliver it to the mill water mains at 45 lb. pressure. (Fig. 5).

Both the low head and the high head pumping systems are equipped with flow meters of such a range that the capacity of all pumps operating at one time, or the capacity of each pump separately, can be read to the standard of accuracy of commercial flow meters.

New Saveall and Bleach Washing Equipment

Some time ago a more complete analysis of white water losses was made. The same condition existed that all other mills find unless they have adequate saveall equipment. It was found that the paper machines themselves were not the only offenders. In No. 2 mill a stock conversion plant is operated, or an old papers pulp plant as some call them, with about 35 tons capacity This was washed on a continuous washing system and bleached washed on a section of the same type machine. It was discovered that the waste water from this bleach washer averaged as high a fibre loss as a paper machine. The loss was eliminated by the installation of an Oliver drum type filter, size 6 ft. x 10 ft., and the effluent from this, which is as clear as drinking water, is used for washing the old papers before bleaching.

An 8 ft. x 12 ft. Oliver drum type vacuum saveall was installed

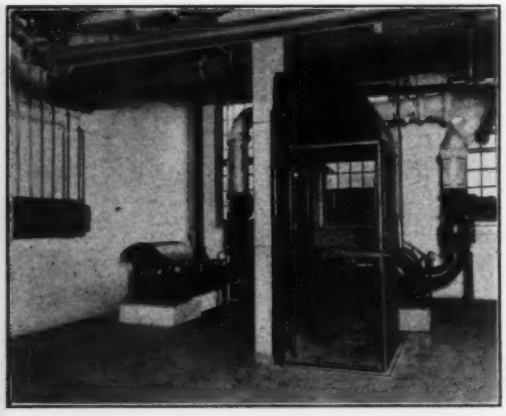


FIG. 4

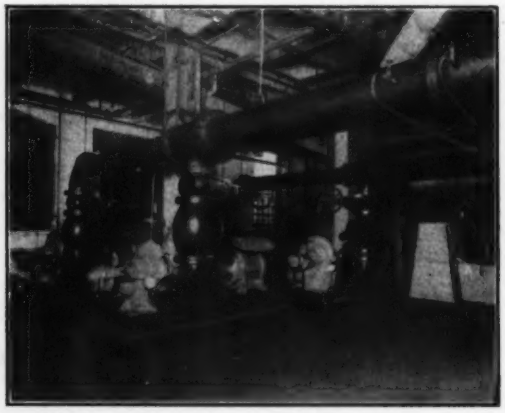


FIG. 5

Repeat Orders Prove!

The Efficiency of XCEM SLIME REMOVER

More than 100 paper companies sent in repeat orders for XCEM No. 70 SLIME REMOVER last year and new ones are being had daily. This is proof of the entire satisfaction this product is giving.

XCEM No. 70 is particularly effective for removing slime from paper making machinery and piping during the washup and for stripping of color at the same time. 10 pounds of XCEM No. 70 per 1,000 gallons of water are recommended for this service. This solution is circulated through the system for from 30 to 60 minutes after which it is run into the sewer and the system flushed with clean water.

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Cleaning of the following:

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on each of the four paper machines in No. 2 mill to reduce the white water losses to a minimum. In No. 1 mill, two 8 ft. x 14 ft. Olivers were installed to bleach wash old paper stock from a large commission plant. The white water from five paper machines is used on these Olivers for washing out the bleach and the fiber which it carries is saved with the old papers which have been washed. An 8 ft. x 14 ft. Oliver was also installed as saveall on No. 6, a 172 inch machine.

The eleventh machine is a 128-inch six cylinder board machine. While the shower water necessary is very much more than that required on a fourdrinier type of the same width, the fiber loss in this water is almost negligible. At the present time there is in operation on this machine a news washing and thickening process which has a fiber loss considerably more than it should be, and this will be replaced by January 1930, with a ten foot diameter, six disc, high capacity, American continuous filter now on order. The new system will have double the capacity of the present system. In addition to the fiber saving effected by the installation of more efficient saveall, washing, and thickening equipment, it has been possible by careful analysis of shower requirements to reduce fresh water requirements about 25 per cent.

Research Department

The Research Department has expanded with the modernization program from a few men to forty, all of whom are specialists in their particular lines of work. Great progress can be noted, particularly in the process of coating and improvement of printing quality.

Five years ago coated papers of Champion manufacture were comparable in smoothness to similar grades of other manufacturers. Today their cheapest grade is smoother than the best coated paper of five years ago. This very remarkable advance in the quality of papers has been due to improvement of almost every chemical and mechanical step of the coating process.

To show the extent of this improvement, one of the pictures on the preceeding page is a micro-photograph enlargement of their cheapest enamel paper of present standard quality, compared with one of the best coated papers made just five years ago. Similar micro-photographs constantly taken of other papers show a corresponding increase in printing quality. The human eye is no longer the criterion of Champion quality.

The great factor entering into this quality is the "control" of the details of the coating mixture. The Research Department, composed of chemists, mechanical engineers, printers and representatives of other professions, are constantly working out new formulas, new methods, and are in direct contact with consumers in an effort to produce papers which can be printed faster with greater economy with no loss of effect.

500-ton Paper Mill Wanted

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., October 28, 1929.—From Vancouver it is announced that it will be necessary to double the original plans for a pulp and paper plant at Prince George, on the Nechako River, in order to make it capable of yielding a return on the investment. This is the statement of J. Stadler and other engineering and power experts, after completing a survey of the site for the new undertaking. Instead of an initial outlay of $3,000,000, as at first estimated, it would require an expenditure of at least $6,000,000 to harness the Nechako River and store sufficient water for the magnitude of the operations now being planned.

In the opinion of Mr. Stadler, the enterprise requires a paper mill with a daily capacity of 500 tons and about 100 tons of pulp suitable for the manufacture of artificial silk.

Driving of logs on the Fraser River and the impounding of a sufficient quantity near the mill site are other problems to be worked out. Under the enlarged proposal it would probably also be necessary to reopen further negotiations with the provincial government regarding timber rights.

West End Paper Mill Improvements

[FROM OUR REGULAR CORRESPONDENT]

CARTHAGE, N. Y., October 26, 1929.—The remodeling of the West End Paper Mill, recently purchased by the Crown-Zellerbach interests, is progressing rapidly under the supervision of R. H. Lee, paper mill engineer from Chicago. The new owners are planning a large expenditure to place the mill in position for capacity operations. The plans also call for the construction of a new addition which will provide 10,000 square feet of additional manufacturing space and contract has already been awarded to the Hodges & Foster Construction Company, of Watertown. A large force of workmen are being employed on the extensive improvements to the plant and excavation work on the new addition has been started. A section of the old mill building has been removed and it is planned to replace this with a new wall.

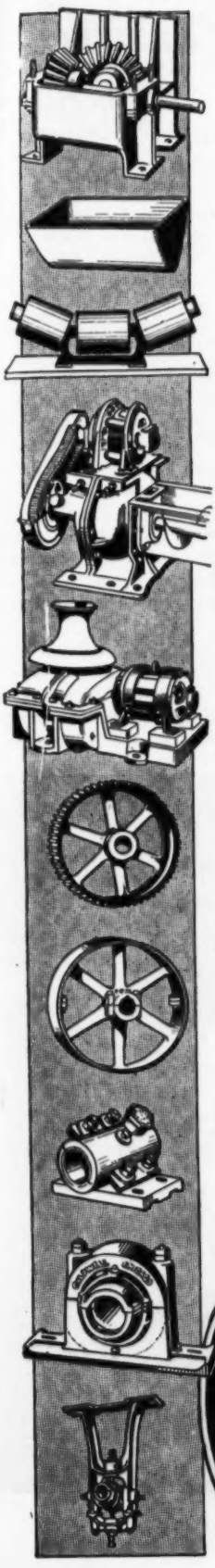
The new owners have also announced the purchase of a new 147 inch paper machine from the Scott Tissue Company which has been used only slightly in the firm's plant in Chester, Pa. The machine is stored in several temporary buildings surrounding the mill and will be installed in the new addition as soon as it is completed. The present equipment of the plant consists of a 132 inch machine. The new building which will house the new machine is being constructed on the northwest end of the original machine room and the cement walls have been blasted out of the main mill in order that the two plants may connect with each other. In addition to the work being done in the machine rooms the belt drives which were formerly used by the West End Paper Company are being replaced by electric turbine drives. Both machines in the newly remodeled plant will be driven by turbines as will also the entire wood mill and grinding room.

New roofs are being placed on the main mill building under the direction of W. O. Adner, contractor. The pulp mill is the center of the roofing work and in this structure are housed five machines which will be used by the new owners besides six water grinders and two electric grinders. This machinery which is housed directly north of the machine rooms is being completely reconditioned by paper mill machinists and the turbine drives installed. The water wheels in the rear of the mill have also been torn down and reconditioned preparatory to starting the new mill. E. B. Eddy, general manager of the Crown-Zellerbach interests in this section, says that although he does not know the exact number of men to be employed by the company when it starts operations it would not be over-estimating to place the number at more than 200. It is expected that the plant will be running full time within a few months.

Racquette River Paper Co. Entertains

[FROM OUR REGULAR CORRESPONDENT]

POTSDAM, N. Y., October 26, 1929.—The Racquette River Paper Company is entertaining a group of men prominent in the paper trade at their hunting lodge, "Granshue," in the Adirondacks. The party includes the following: J. Millard Arnold, Whitaker Paper Company, Baltimore, Md.; I. B. Eltinge, Samuel Cupples Envelope Company, New York; Edgar McCallum, Boston Envelope Company, Boston, Mass.; J. C. Mallalieu, George W. Millar & Co., New York; W. E. Ebbets, W. A. Ebbets, Coy, Disbrow & Co., New York; George Beggs, Hubbs & Hastings Paper Co., Rochester; H. J. Severance, Hubbs & Howe Co., Buffalo; Stuart Andrews, P. L. Andrews Corporation, Glendale, N. Y.; Edward Eaton, Eaton Paper Company, Boston; James Wiley, Berlin & Jones Company, New York; Beret Oles, Oles Envelope Company, Baltimore; Jay Smith, J. & F. B. Garrett Co., Syracuse; Robert Gray, Gray Envelope Company, Brooklyn; Wilford Saul, W. J. Gage & Co., Toronto, Canada; Arthur Sherril, Riegel & Co., Philadelphia, Pa.; Louis Reynal, American Paper Goods Company, Kensington, Conn.; Howard Reinman, Rochester Envelope Company, Rochester; John Sheldon, E. H. Sheldon & Co., Muskegon, Mich.; Robert Coy, Coy, Disbrow & Co., New York; Lawrence Reinman, Buffalo Envelope Company, Buffalo.



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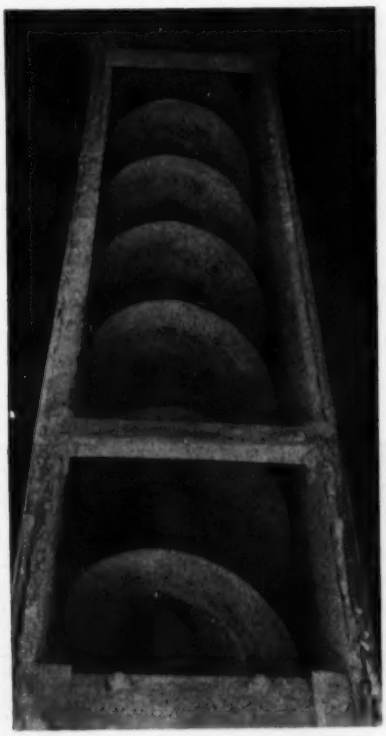

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C-193

CALDWELL

Grays Harbor Mill Has Unique Features

Pulp From Pulp Mill Can Be Pumped to Storage Tanks Alongside Beater Room In New Sulphite Bond and Writing Paper Plant at Hoquiam, Wash.—Finished Paper When Ready for Shipment Is Adjacent to Docks or Cars For Distribution, Due to Location

Construction of the new paper mill of the Grays Harbor Corporation at Hoquiam, Wash., was started in September, 1928, under the supervision of V. D. Simons, Inc., paper mill engineers, of Chicago, Ill. The site chosen is adjacent to the sulphite pulp mill, which was practically completed when the construction of the paper mill started. When the pulp mill was built, arrangements were made in the power plant so that additional boilers and turbines could be installed for developing the necessary power for the paper mill. The water works installation was also made sufficiently large to take care of the additional water required for paper making. The pile driving was completed during November and the concrete construction followed immediately thereafter.

The mill is so arranged that pulp from the pulp mill can be pumped to stock storage tanks along side the beater room, and the general location of the mill is such that when the finished paper is ready for shipment it is either adjacent to the docks where it can be moved by water, or to cars for general freight distribution.

Buildings are reinforced concrete throughout, with the exception of the roofs, which are wood carried on steel trusses. The main operating floor is 16 feet above the natural ground level so that the driving apparatus and stock storage chests are set on the ground floor.

Stock from the pulp mill is thickened by means of deckers in the beater room and conveyed to the beaters by means of a worm conveyor. The equipment in the beater room consists of eight beaters built by the E. D. Jones Company. These beaters were made after a special design and the concrete tubs are tile lined. After beating the stock passes through Jordans made by the E. D. Jones Company.

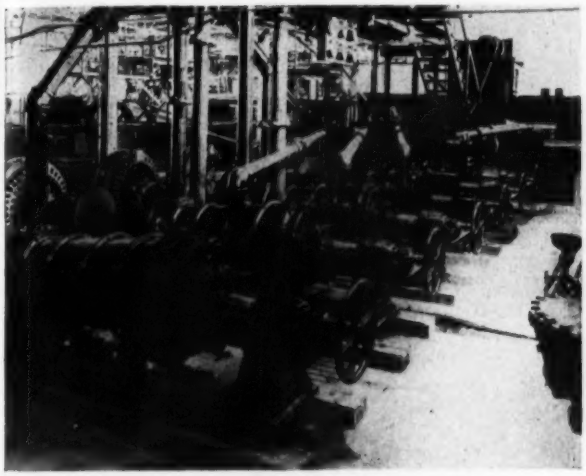
Equipment of Paper Machine

The paper machine is equipped with Bird screens and a Valentine stock inlet. The wet end of the machine was built by the Beloit Iron Works and the dry end of the machine by Bagley & Sewall. The machine is equipped with a Westinghouse sectional electric drive. The fourdrinier is Beloit's latest design of the shaking removable type with wire 202 inches by 90 inches long.

Table rolls are built of special light construction and mounted in Timken bearings. Suction boxes are equipped with hydraulic oscillating devices. The suction roll is the Beloit patented type which is specially designed to facilitate easy changing of wires. All rolls in the fourdrinier part are equipped with anti-friction bearings.

The machine is equipped with three presses through two of which the paper passes straight ahead and the third press is reversed. Automatic carriers take the paper from the second press through the third press to the smoothing press. The top press rolls are of granite and the bottom rolls are rubber covered.

AIRPLANE VIEW OF PLANT OF GRAYS HARBOR PULP & PAPER CO., HOQUIAM, WASH.



6 Emerson Jordans installed at the new 60 ton kraft mill

New 60 Ton Kraft Mill Equipped With Emerson Beaters and Jordans

For 35 years, this maker of kraft paper has used Emerson Beaters and Jordans, checked their performance, compared costs, placed continued repeat orders * * * A new 60 ton kraft mill, built to take care of increased business, modern, efficient, is *completely* equipped with modern beaters and jordans built by Emerson * * * From boards to tissues, Emerson Beaters and Jordans are helping makers of every grade of paper to improve quality and uniformity, lower beater and engine room costs. They will help you to meet competition at a profit. Write for information.

The Emerson Manufacturing Co.
Lawrence Mass.
Division of
John W. Bolton & Sons, Inc.

Beater room of the new kraft mill showing 12 Emerson Beaters in operation

3432

GENERAL VIEW OF FINISHING ROOM.

GENERAL VIEW OF MACHINE ROOM.

Special Gear Arrangement for Dryers

Forty-five foot dryers are driven with a special gear arrangement which permits the back side of the machine to be practically as open as the front side. Dryers, felt rolls, etc., are carried in Timken roller bearings. Dryer felts are divided and each of the two felts on the wet end is provided with two felt dryers and each of the felts on the dry end is provided with one felt dryer. These felt dryers are mounted in Timken roller bearings and are driven by the felts.

The machine is equipped with 1-8 roll calender stack, having standard bearings of the ring oiling type; Bagley & Sewall uniform speed reel, and a Bagley & Sewall high speed two drum winder. The rolls of paper from the winder are taken to the finishing room where the paper is cut on Hamblet cutters equipped with lay-boys and Maxon counters. After sorting, the paper is trimmed and cut to size on Seybold cutters. This paper is ream sealed and packed in bundles or cases, ready for either rail or water shipments.

The plant was built and is owned by the Grays Harbor Pulp and Paper Company and leased to the Grays Harbor Corporation, which latter company is in charge of the manufacture and sale of the paper.

Brown Paper Mill Co. to Extend Kraft Plant

The Brown Paper Mill Company, Inc., of Monroe, La., have let general contract for new buildings to M. C. Tuttle Company, Boston, Mass. This extension will increase present production from 175 tons daily to 350 to 400 tons daily, giving what is said to be the largest daily production of kraft in any mill in the South. The equipment for this extension will include:

Two 176 inch paper machines; one of which will be a fourdrinier, and the other a cylinder machine.

Two electric drives for the above. All auxiliary pumps, motors, agitators, etc. for same.

Twelve jordans and six synchronous motors.

One breaker beater.

One barking drum.

One chipper.

Necessary conveyors.

Chip screen and crusher.

Eight three and one half ton rotary digesters and drives.

Necessary pulp washing equipment, agitators, pumps, pulp screens, and thickeners.

Eight sulphate smelt furnaces.

Eight waste heat boilers and settings.

Causticizing and green liquor clarifying equipment.

Lime kilns for reburning the lime.

Miscellaneous pumps and steel tanks.

Steam evaporators.

Additional artesian wells will be drilled to give a total supply of nine thousand gallons of water per minute. This work will include necessary pumps and motors.

Four 850 hp. boilers and settings with steam purifier, and gas burner equipment.

One 7500 kw bleeder turbine, switchboards, condenser equipment, and feed water heater.

A new 12 feet x 250 feet chimney will also be erected.

There will be several thousand motors, ranging in size from one hp. to six hundred hp., including all starting equipment. The power wiring will be done by the owners.

All items of building construction will be handled through the general contractor's organization. All equipment will be purchased through the office of Geo. F. Hardy, consulting engineer, of New York City, who will also handle all details of design for the entire project.

The company has recently purchased additional timber lands which will bring the total of holdings to approximately a quarter of a million acres.

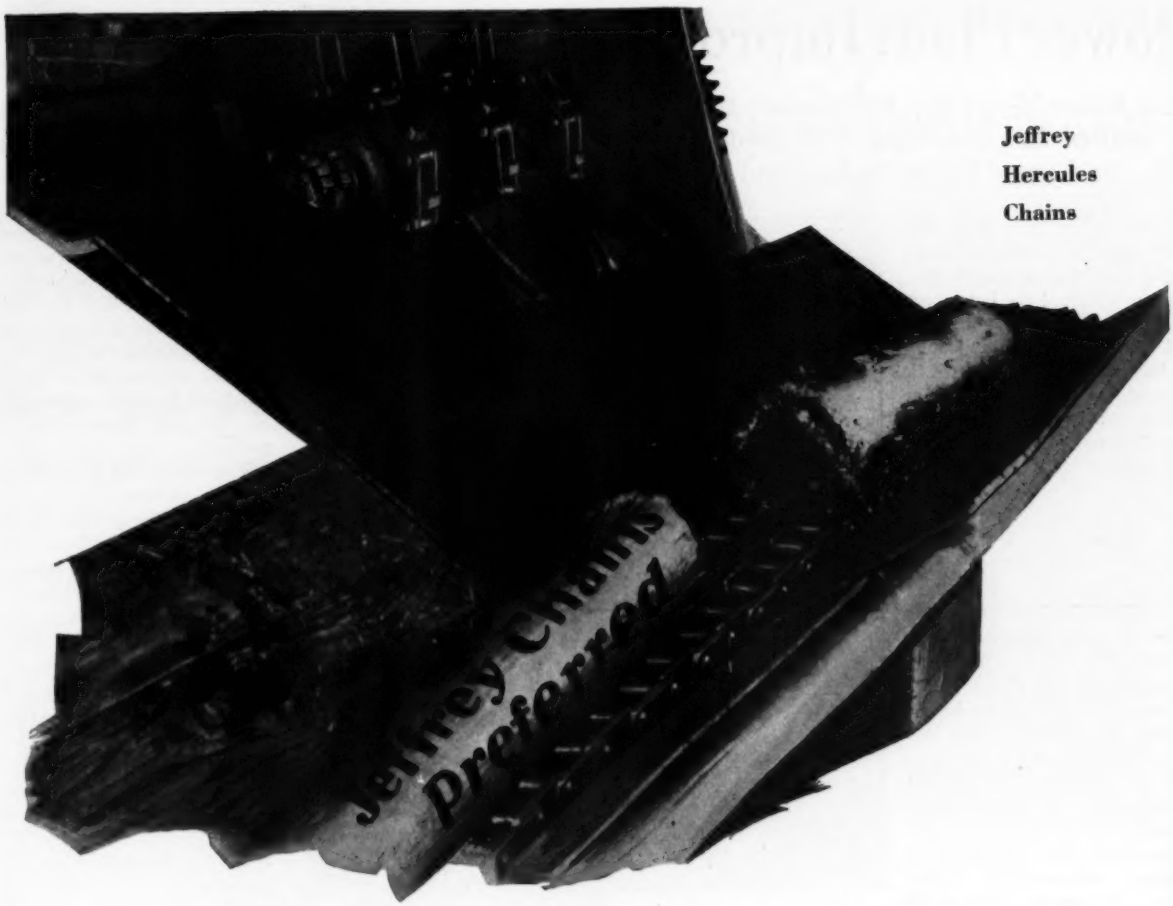
Additions will be made also to the company's railroad, which will make in all, about twenty-five or thirty miles of track.

Total expenditures for the additions will amount to approximately five million dollars.

Standard Paper Installing 120 Inch Machine

Standard Paper Manufacturing Company, makers of standard blottings, of Richmond, Va., are installing a 120 inch paper machine in their Mill No. 3. The machine is being built by Rice, Barton & Fales, and will be driven by sectional electric drives installed by the General Electric Company.

Other additions to Mill No. 3 will consist of extension to finishing room, new filtration plant installed by the Permutit Company, and the rebuilding of the power plant. The only buildings to be erected are extensions to beater room, with a three story and basement building, and extension to the finishing room of a two story and basement building. The improvements will cost approximately $500,000.



Jeffrey
Hercules
Chains

Here's a Jeffrey Hercules Chain installation in the ground wood mill of another company that has standardized on Jeffrey Chains because they want dependable service—continuously.

The following features of Jeffrey Hercules Chain illustrate the carefully balanced design found in all Jeffrey Chains.

Strap links—high carbon steel. Malleable block links—hard skin for wear—a tough interior to withstand pounding. Barrel of solid link has long pin bearing—extra metal added where barrel engages sprocket tooth.

D-shank pins—high carbon steel—locked in strap link confining all wear to long bearing of block link—full diameter gives 25% greater strength than milled pins.

You can select the proper chain for your needs from our Catalog No. 480-E. *May we send you a copy.*

The Jeffrey Manufacturing Company

931-99 North Fourth St., Columbus, Ohio

New York	Philadelphia	Cleveland	Milwaukee	Charleston, W. Va.
Buffalo	Pittsburgh	Cincinnati	St. Louis	Atlanta
Utica	Scranton, Pa.	Chicago	Denver	Birmingham
Rochester, N. Y.	Boston	Detroit	Salt Lake City	Houston

Jeffrey Manufacturing Co., Ltd., of Canada. Head Office, Montreal; Branch Office, Toronto.

JEFFREY
MATERIAL HANDLING EQUIPMENT

Jeffrey Products
for
Pulp & Paper Mills

Elevators
Conveyors
Portable Loaders
Coal and Ashes Handling Equipment
Skip Hoists
Chains and Attachments
Sprocket Wheels—Gears
Crushers—Pulverizers
Locomotives
Ventilation Fans

Power Plant Improvements at Fort Howard Mill

New Boiler House Has Continuous Rating of 34,000 lbs. of Steam Per Hour—Superheater Installed In Connection With Boiler—Two Story Building Recently Completed Takes Care of Steam Turbine and Motor Generator—Traveling Crane Also Installed

Construction of the new boiler plant of the Fort Howard Paper Company at Green Bay, Wis., was started the latter part of 1927. Building is of brick and steel construction and is 58 ft. long, 53 ft. wide, and 65 ft. in height. The boiler was installed in the spring of 1928 and was first turned on in May of that year.

Equipment consists of one 5,060 sq. ft. five drum water tube boiler, stoker fired, underfeed type. Coal is handled by bucket elevators which dispense it overhead in bunkers. This boiler has a continuous rating of 34,000 lb. of steam per hour. A superheater is also installed in connection with the boiler, giving approximately 150 degrees of superheat.

In the basement of the boiler house is the ash hopper, water softener equipment, one turbine-driven boiler feed pump; also a Duplex reciprocating boiler pump. A modern smoke stack was erected, being made entirely from concrete, and 193 ft. in height, 8 ft in diameter at the top.

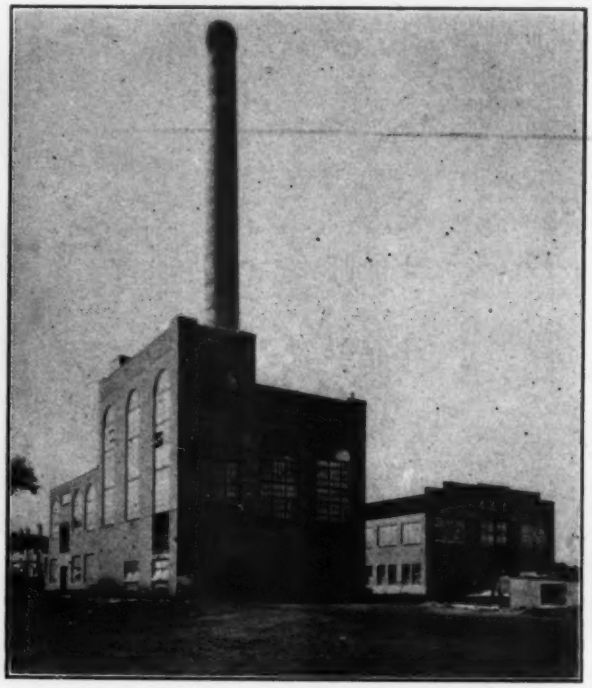


FIG. 1.
In the foreground is the new boiler house. Immediately to the left rear is new turbine building. To the right appears a portion of warehouse

Immediately adjoining the boiler plant, a building 34 x 57 ft. and 35 ft. in height was erected and completed in the spring of 1929. This building was to take care of a steam turbine and generator. There are two floors, the lower floor is the condenser room floor and on the upper floor is the turbine room with the motor generator set and switchboard. A tenton traveling crane is also installed on the upper floor in case of additional installations or repairs which might have to take place on either the generator or the turbine.

The turbine and generator was put in actual use in July of this year. The equipment consists of an 1875 KVA turbine operating at 300 lb. steam pressure with a total steam pressure of 600 degrees. A small auxiliary turbine is also installed of 100 KW capacity.

The motor generator set for driving the paper machines consists of one 650 KVA synchronous motor, 1200 RPM, direct connected to two 200 KW 250 volt D. C. generators and exciters. Switchboards are provided for distribution of alternating and direct current, together with all the regulating equipment for the paper machines and low voltage.

The Crown-Willamette Paper company is planning to build a mill at Cathlamet, Wash., to cut up logs which are too short to raft. These short pieces will be loaded on barges and taken to mills at Oregon City and Camas to be converted into pulp. Work of cleaning and driving the piling has started.

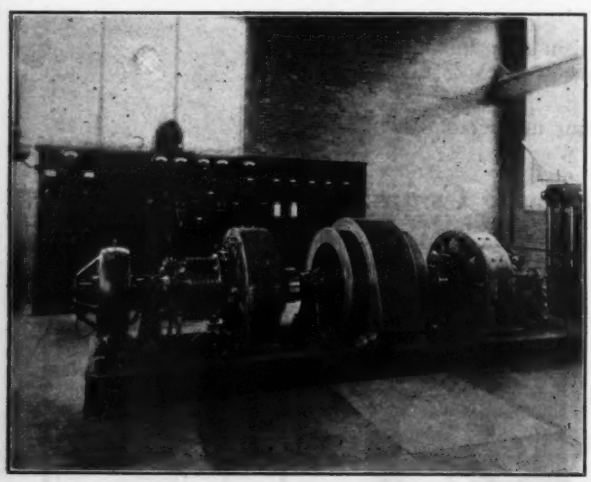


FIG. 2.
A view showing generator set and a portion of switchboard.

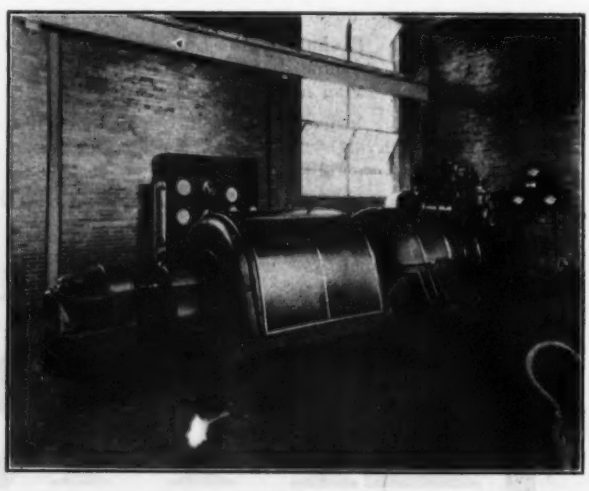
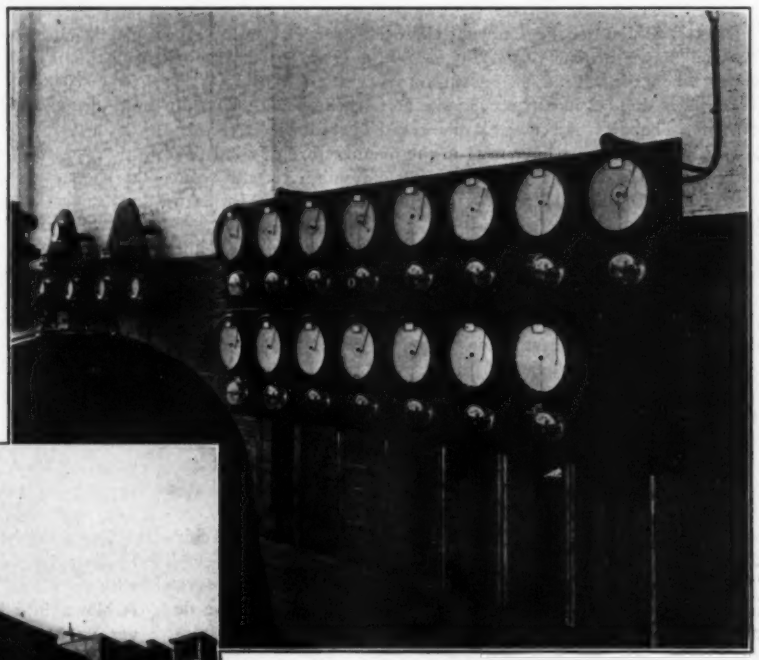


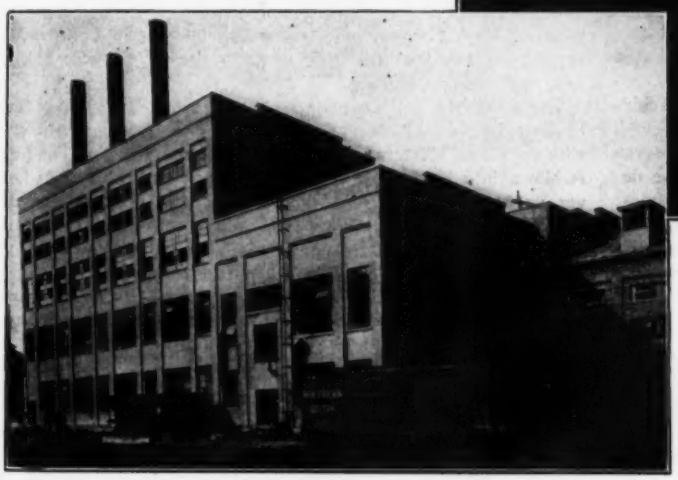
FIG. 3.
A section of turbine room showing the 1875 K. V. A. Turbine.

BAILEY ELECTRICALLY OPERATED FLUID METER

Accurately measures

The flow of steam and water through pipes and provides for economical operation





The Power-Process Plant of the Jno. H. Heald Paper Co. at Lynchburg, Virginia uses Bailey Electrically Operated Fluid Meters to secure the greatest economy in operation of their plant, which is only possible with proper metering and control equipment. Recording the exact amount of steam and water flowing through pipes Bailey meters furnish information of greatest value, insuring efficiency and preventing losses.

The Jno. H. Heald paper plant is an example of modern steam engineering

Bailey Electrically-Operated Fluid Meters can be furnished to suit practically any condition with the most accurate results, measuring exactly the amount of steam delivered to a department or consumed by turbines—discovering losses from leaks—measuring gases and all liquids—determining the efficiency of compressors.

Each Bailey Meter is carefully calibrated to operate under steady flow conditions, such as occur when supplying steam to turbines, heating systems, manufacturing processes, etc.

Use BAILEY ELECTRICALLY-OPERATED FLUID METERS for economy in operation.

BAILEY METERS

Bulletin NO. 131 sent upon request

BAILEY METER COMPANY

1056 IVANHOE ROAD CLEVELAND, OHIO

Largest Paper Machine In U.S. In Operation

National Paper Products Co.'s New 200 Ton Kraft Paper Mill, at Port Townsend, Wash., Contains 251 Inch Fourdrinier Capable of More Than 1,000 Feet Per Minute—Paper Handled by Overhead and Electric Lift Trucks—Modern Power Plant

Latest addition to the Crown Zellerbach group of mills, the National Paper Products Company, a 200 ton kraft mill, was completed when the second unit went into operation May 13, 1929. The mill is divided into two complete units each of 100 tons daily capacity. The first unit which commenced operations on October 6, 1928, produces kraft liner used in the manufacture of solid fiber and corrugated shipping cases. The second unit, recently completed, produces kraft paper for general usage in such forms as bag and wrapping paper.

The mill is located on a 287 acre site, approximately three miles southwest of the City of Port Townsend, Wash. Part of the site consists of tide lands and part of land obtained as a result of the necessary dredging operations to produce water of sufficient depth to allow the largest ocean going vessels to take on or discharge their cargoes at the plant docks. The mill is also served by the Olympic Division of the Chicago, Milwaukee and St. Paul Railway, permitting in addition direct rail shipments.

Strategic Position of Mill

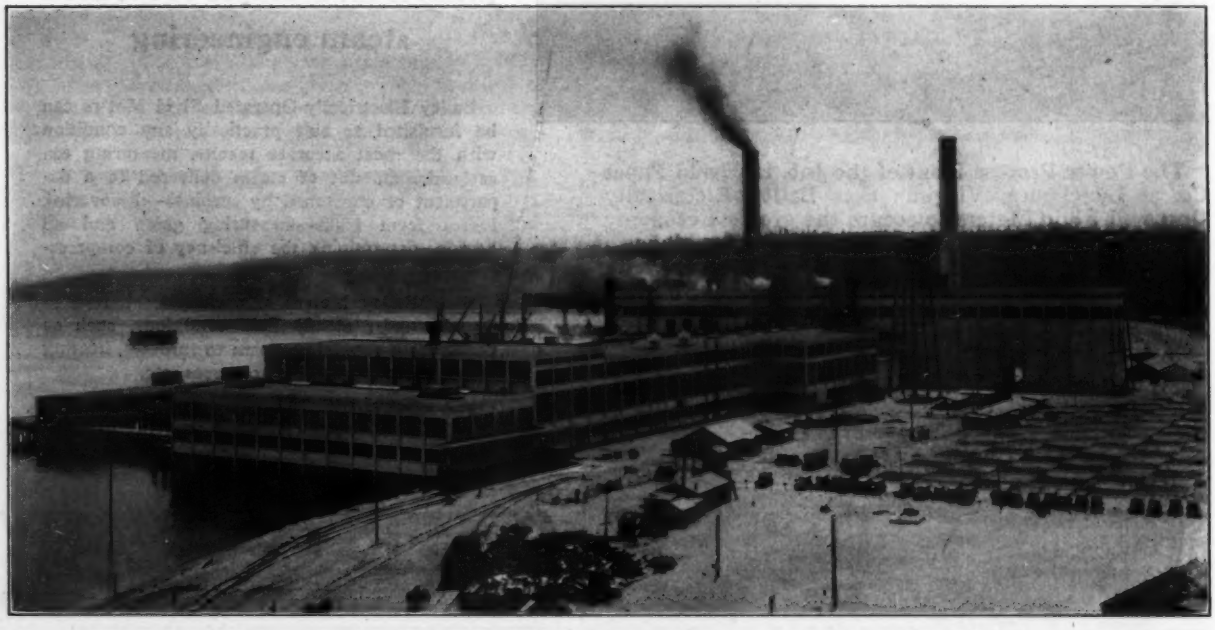
The strategic position of the mill site at the head of Puget Sound just at the entrance to the Straits of Juan de Fuca, enables it to receive by scows most conveniently, supplies of chips and hog fuel from the many lumbering centers on the Sound. The completed mill occupies a ground area of slightly over seven acres with a floor area of approximately sixteen acres. The design of the buildings composing the mill represents the most modern thought in paper mill construction. The buildings rest on piling foundations and are entirely of reinforced concrete and steel. Steel sash has been employed on all elevations, resulting in the maximum use of natural light and at the same time presenting a most pleasing architectural effect.

The large volume of water required in the mill's operation is supplied by a 31 mile pipe line furnishing a flow of approximately 16,000,000 gallons of water per day from the adjacent streams of the Olympic Mountains.

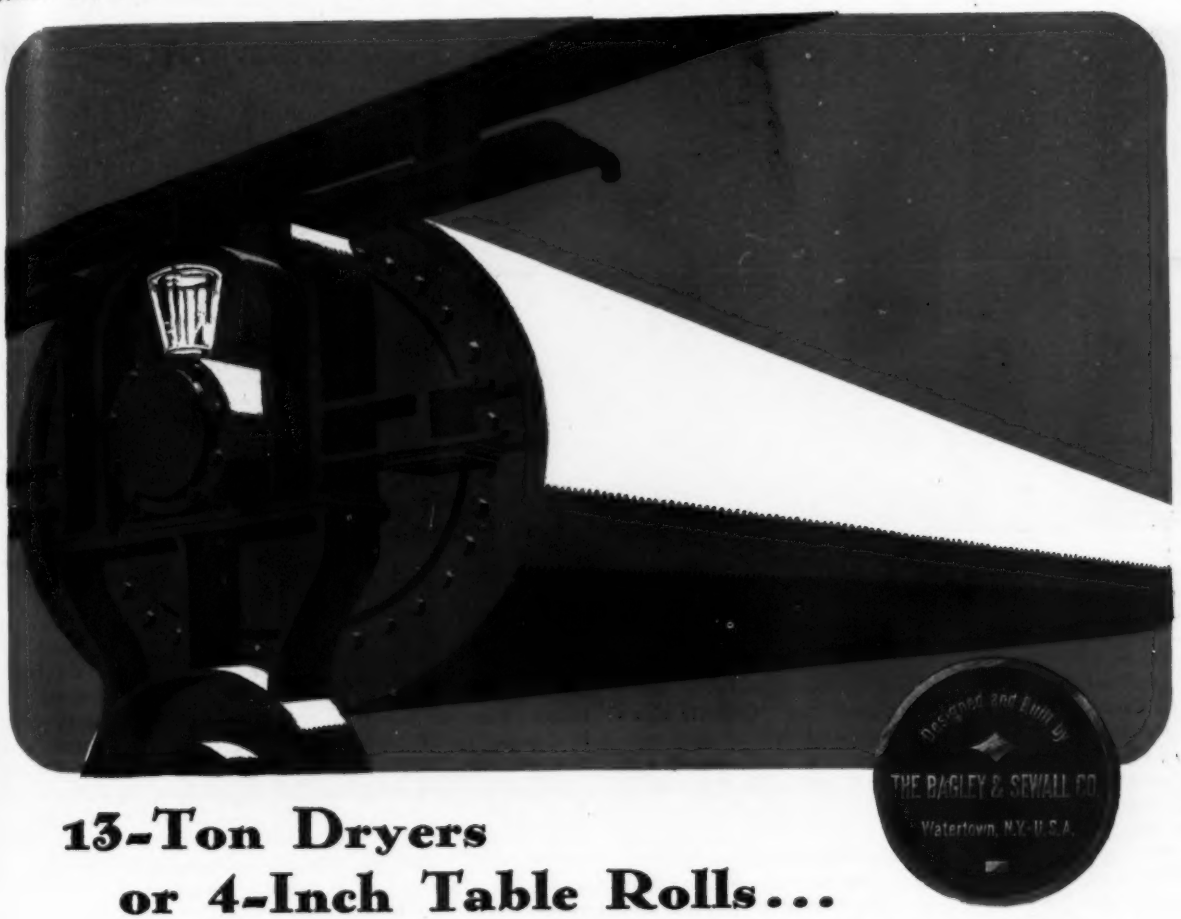
Continuous Flow of Materials

The outstanding feature of the mill is the continuous flow of materials as they are converted from the raw to the finished state. Incoming raw materials and fuel are received by barge and boat. The barges are unloaded with four lines of Pawling and Harnischfeger mono rail equipment supported by an overhead steel structure 110 ft. long, 100 ft. above the water. One end of the steel structure rests on the concrete raw material storage buildings and the other on two steel towers on concrete piers. Beyond these towers is a large unloading wharf where the boats may discharge their cargo to be subsequently handled by the monorail system. Stiff-leg derricks together with Link-Belt bucket elevators and endless belt conveyors, supplement the mono rail unloading equipment and the dual installation permits the conveying of raw materials direct to the point where processing begins or to storage.

The completed mill contains six Kellogg stationary forge and hammer lap welded steel digesters. Cooking is done indirectly with the aid of Morterud heaters and circulating pumps. The pulp is blown into large blow cyclones and then passes through Oliver washers The resulting black liquor and pulp are accumulated in large concrete chests from where former is pumped to the Recovery room for reclaiming of chemicals and the latter to the paper mill for refinement and hydration of fibers. The black liquor is concentrated from 11 degrees baume to 70 per cent solids in Buffalo vertical rapid circulation type evaporators hav-



PLANT OF THE NATIONAL PAPER PRODUCTS CO., PORT TOWNSEND, WASH. TO WHICH SECOND UNIT HAS BEEN ADDED.



13-Ton Dryers or 4-Inch Table Rolls... and Not a Flicker of Vibration

***Balance*—dynamic balance, running balance; *Bearings*—friction-free Timkens; *Precision*—perfect micrometer caliper, surfaces finished to the nth degree; these are factors that account for the smooth vibrationless performance of *all* Bagley & Sewall rolls. So smooth that a 48 roll dryer section coasts eleven minutes after power is cut off. So vibrationless that a brimming glass of water may be balanced on a journal without spilling a drop. And these factors are reflected in economies of production and maintenance—in low power consumption, in longer life for wires and felts, in the minimizing of broke, in infrequent replacements, in uniformity of paper finish. Bagley & Sewall is equipped to make such rolls and organized to use its equipment to fullest advantage. And it's to *your* advantage to make fullest use of this equipment and this organization.**

The Bagley & Sewall Co.

Watertown, N.Y.

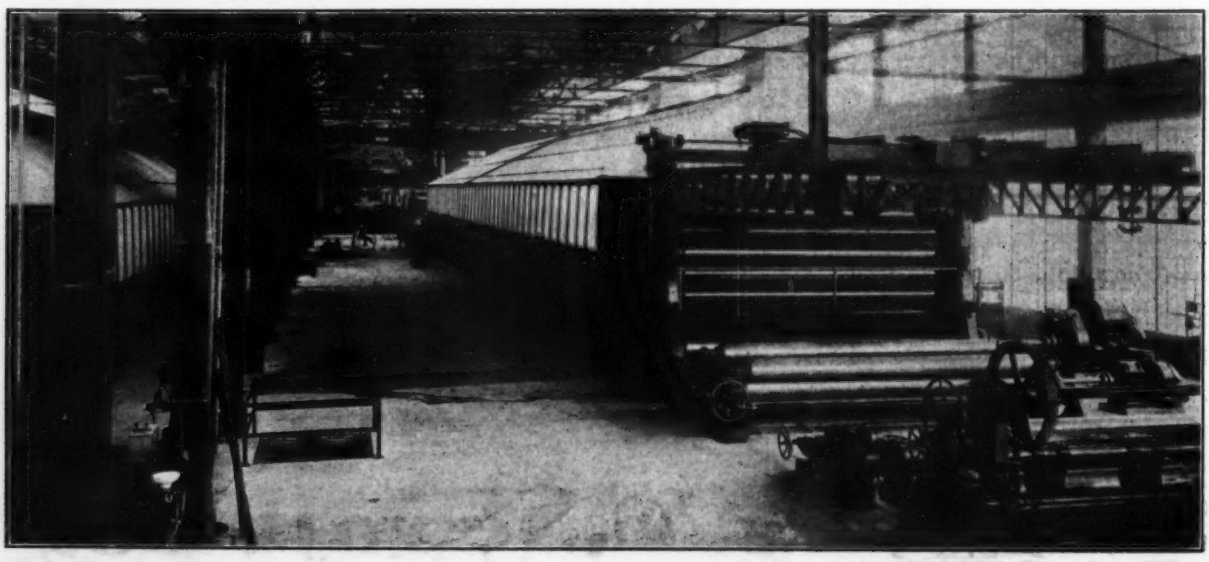
VIEW IN THE BEATER ROOM OF THE PORT TOWNSEND MILL.

ing a quadruple effect with auxiliary finishing pans or concentrators. The concentrated black liquor is sprayed into smelter furnaces lined with chrome brick and soapstone. Here the soda is recovered and the waste heat utilized to generate steam.

The Causticizing Plant is of the Batch type. Concrete chests provide ample storage for white liquor. Adjacent to the Causticizing Plant is a Manitowoc rotary lime kiln 110 ft. long by 8 ft. in diameter for recovering lime from the sludge. An Oliver mud filter de-waters the lime sludge before entering the kiln. The pulp after leaving the Oliver washers, passes successively through Improved Paper Machinery Company's knotters, Reed-Spafford centrifugal screens and Improved Paper Machinery Company's deckers. The deckered stock is refined in Jones best type high speed 2,000 lb. beaters. Dilts and Shartle broke beaters complete the installation. Hydration of accepted stock is continued in Jones motor driven Majestic jordans.

Kraft Liner Board Machine

Number 1 machine is used for the production of kraft liner board. After leaving the jordans the stock for this machine is screened in Packer plate screens from which it flows onto the 130 inch seven cylinder board machine. This is of the latest Black-Clawson vertical dryer type, trimming approximately 112 inches. There are four main presses and 98 dryer rolls 42 inches in diameter by 146 inches face. Condensate is removed by a Farnsworth double separating drying system and vapors exhausted by means of a transite hood and Clarage fans. A modern two drum upright belt driven reel of the removable drum type and a two drum Langston winder with slitting attachments, completes the dry end of the machine. One of the features of this installation is the employment of a Westinghouse sectional drive on the entire machine from the cylinder moulds to the rewinder. On cylinder machines in the past it has always been the custom to depend upon the bottom felt and the first press to drive the primary presses and cylinder moulds in back of it. With the installation at Port Townsend the bottom felt is not required to operate as a belt but functions only in the formation and extraction of water in the sheet. This is the first installation of this new



NEW 251-INCH FOURDRINIER, THE WIDEST IN THE UNITED STATES.

M.&W. Single Fender Automatic Wire Guide

This type of Wire Guide for Fourdrinier Paper Machines making any kind of paper is highly recommended. It will give longer life to Fourdrinier wires than any other guide on the market, and can be operated at the lowest possible upkeep expense ▲ ▲ ▲ The pawl when engaged in the teeth of rachet wheel, has a full bearing surface, eliminating wear, also obviating the purchase of many expensive rachet wheels and pawls. ▲ ▲ ▲ When the wire is running in the center of the machine the pawl cannot transmit any motion to the guide roll. Should the wire travel to the other side of the machine, the positive and quick action of the pawl would immediately cause the Wire Guide to properly align the wire ▲ ▲ ▲ The Single Fender feature on these Guides increases the life of the wires considerably, as only a very slight contact between the fender and wire is sufficient to operate the Wire Guide when necessary ▲ ▲ ▲ The single fender Guide is more convenient, especially when putting on new wires. It is very desirable for wide paper machines. Guides made with reducing gears and ball bearings to suit high speed machines ▲ ▲ ▲ ▲ ▲ ▲

Guides made with reducing gears and ball bearings to suit high speed machines.

SEND FOR BULLETINS ON WIRE AND FELT GUIDES

THE MOORE & WHITE CO., NORTH PHILA. STATION PHILADELPHIA, PA.

PAPER · MACHINE · BUILDERS

type cylinder machine drive and its operation has been extremely satisfactory.

The finished rolls from number one machine are stored in a large roll pit and warehouse with the aid of a Pawling and Harnischfeger traveling crane and several units of the latest designed Elwell-Parker electric lift trucks.

Immense Fourdrinier Machine

This Fourdrinier machine is said to be the largest paper machine in the United States, with a wire width of 251 inches. The dry end of the machine including reels and rewinder are the Beloit removable type. This machine is capable of over 1,000 ft. per minute. There are 44 sixty-inch dryers. Timken bearings have been used to best advantage throughout the machine. The drive, as on number one machine, is of the Westinghouse sectional type. The headbox and Voith inlet were supplied by the Valley Iron Works. One of the features of the Bagley and Sewall winder, which is of the high speed two drum type, is a newly developed motor driven roll handling attachment which delivers the finished rolls from the winder to the floor without the use of slings or other equipment. Paper from number two machine is handled in the same manner as on number one by means of overhead cranes and Elwell-Parker electric lift trucks.

The mill is served by a power plant of the very latest design. The installation consists of nine 838 hp. Stirling type boilers generating steam at 375 lbs. pressure. The boilers are fired by hog fuel and oil. Draft is produced by two 250 ft. concrete stacks erected by the Rust Engineering Company. Water for the boilers is softened by a Permutit system and before entering the boilers passes through units of Cochrane open heaters and Croll-Reynolds closed heaters. Mechanical hog fuel stokers of original design complete a very modern boiler plant.

The prime movers consist of three 3750 KVA General Electric double extraction type condensing Turbo generators and one 625 KVA Westinghouse non-condensing Turbo generator. A high station power factor is obtained by the use of synchronous motors wherever possible, particularly on the large loads such as beaters, jordans, motor generator sets, etc.

One of the aims in the mill has been the desire to eliminate as much as possible, the rule of thumb and substitute in its place the more scientific Technical Control. Well equipped laboratories and the most modern of recording instruments are therefore used extensively throughout the various steps of the manufacturing process in order to assure a uniformity of product.

The mill was designed and constructed under the supervision of V. D. Simons, of Chicago, while H. N. Simpson served as his representative in the field in the capacity of resident engineer.

New Maclaren Plants Under Construction

News print and sulphite mills of the James Maclaren Company, Ltd., are being built at Masson, Que., by the Foundation Company, of Canada, and the steel is being supplied and erected by the Dominion Bridge Company. The mills have been designed by Hardy S. Ferguson & Co., of New York, who are also looking after their construction. There will be two paper machines 234 inches wide, built by the Dominion Engineering Company. They are this company's latest high speed machines designed for 1,200 feet per minute. The Fourdrinier is of standard type that can be run with a flat wire 85 feet long or pitched as desired. There will be six flat suction boxes and a Millspaugh suction couch roll. The stock will be delivered to wire through a specially designed single pass head box and a Vandecarr slice. The press part consists of two Millspaugh suction presses and one plain press.

The Drier Section

The drier section consists of 48 driers 60 inches in diameter, two felt driers 48 inches in diameter and one lead drier 42 inches in diameter, arranged for two upper and two lower felts. The drier section will be driven by six General Electric Motors and and whole machine will have General Electric Motors and drive. There will be eight rolls in calendar stack equipment with Warren Doctors. The reels are the English type. The winder will be the high speed type. The stock will pass through a Trimby metering machine to paper machine. There will be four electric boilers, 16,000 K. W. each. The sulphite mill will have two rotary sulphur burners and three digesters and will have the chemi-pulp recovery system.

The Ground Wood Mill

The ground wood mill is located at Buckingham, Que., and has now 12 pocket grinders driven by water wheels. There will be added 16 four pocket Carthage grinders and there will be installed two additional water wheels with capacity of 5200 h. p. each, which will make about 20,000 h.p., all told developed at Buckingham. The stock will go from the grinders through a bull screen, then into a 24 inch pipe line and to the paper mill at Masson, which is about 2½ miles from Buckingham, where the fine screens and Oliver Thickeners will be located.

A power plant which has 180 foot head is being built at High Falls, located about 25 miles from Buckingham, which will furnish the power to run the paper and sulphite mills at Masson. There are three units of 30,000 h.p. each, being installed now, and a little later another unit of 30,000 h.p. will be installed which will make a plant of 120,000 h. p., when completed.

Huge Reservoir Dam

About 25 miles above High Falls, a reservoir dam is being built which will store up about 25,000,000,000 cubic feet of water and can be let out as needed by plants below.

Plans for 300-ton Mill Go Ahead

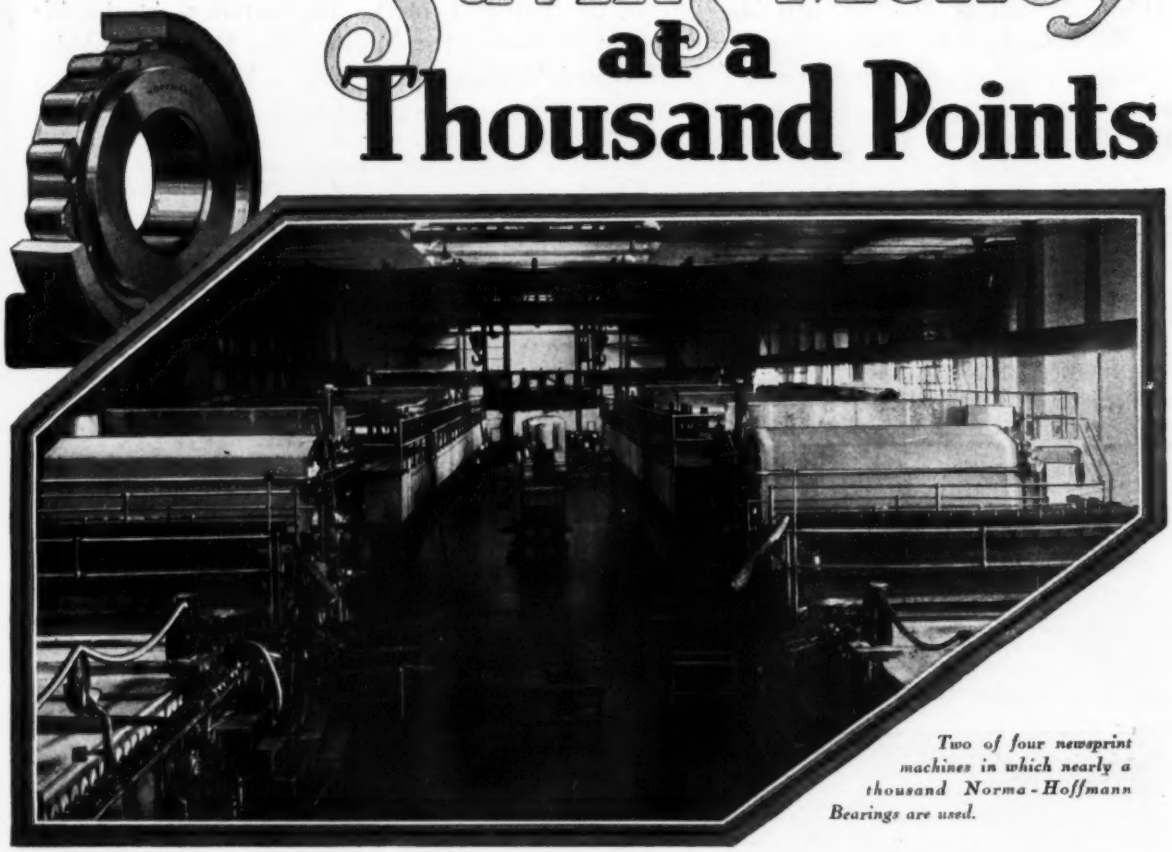
MONTREAL, Que., October 28, 1929.—Arrangements are said to have been completed with an influential financial firm in Montreal, Newman, Sweezey & Co., for financing the huge power and paper project of the McLaren interests at Buckingham, Que., on the Lievre River, 30 miles east of Ottawa. The plans include the erection of a 300-ton news print mill.

The immediate power development will be 120,000 hp., located about 25 miles up the Lievre River. The sale of a great proportion of this power has already been arranged for. A large amount of it will be required by the company itself, and it is believed that a considerable amount will be required for the preliminary work in connection with the new Beauharnois Power undertaking on the other side of the river. A second development of between 30,000 and 40,000 hp. will be undertaken a little later on, while the engineers have also located a third site on the river where as much as another 120,000 hp. will be developed as the demand increases.

Sweden's Chemical Pulp Industry Expands

WASHINGTON, D. C., Oct. 16.—The chemical pulp industry in Sweden is expanding its capacity through the enlargement of existing mills and the establishment of new plants, according to a report from Commercial Attache, Klath, at Stockholm. The market for chemical pulp continues firm at present with prices stable. News print mills are well stocked with orders; a slight decrease, however, is discernible in the forward orders for wrapping papers.

Saving Money at a Thousand Points

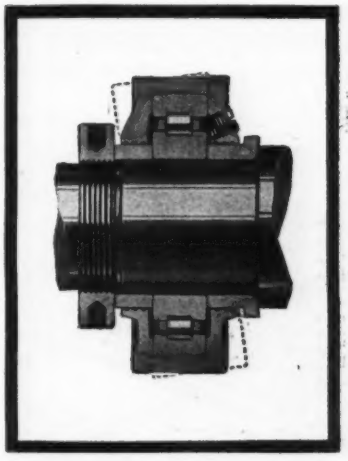


Two of four newsprint machines in which nearly a thousand Norma-Hoffmann Bearings are used.

ON the four modern high-speed newsprint machines in the mill pictured above, almost a thousand NORMA-HOFFMANN Precision Roller Bearings are used on wire rolls, press felt rolls, and dryer felt rolls.

Substantial savings are reported as follows:—wires and felts have longer life; stoppages to change wires and felts are less frequent; nonproductive hours are reduced; power is saved; lubrication is simplified; lubricant is excluded from wires and felts.

NORMA-HOFFMANN Precision Bearings are being used at critical points in a wide range of paper mill machinery. Let our engineers give you the benefit of their experience along these special lines.



"NORMA-HOFFMANN"

PRECISION BEARINGS

NORMA-HOFFMANN BEARINGS CORPORATION STAMFORD, CONN., U.S.A.

Celotex Installs Another Big Board Machine

This Addition Is The Seventh Machine of the Latest Type To Be Installed At the Plant At Marrero, La., To Make Fiber Board From Bagasse—Production Has Been Speeded Up To More Than Five Hundred Million Square Feet a Year

Eight years ago when the Celotex Company completed its experimental work in the manufacture of a semi-rigid cane fiber board and went into production, the mill at Marrero, La., directly across the river from New Orleans, turned out some eighteen million feet during the first year. At the present time, with the recent addition of a seventh boarding machine of the latest type, production has been speeded up to more than five hundred million square feet a year or approximately 1,600,000 square feet a day.

Refinements to Machinery

This tremendous increase in production, made necessary by the wide distribution and sale of this product in almost every corner of the world, has been accomplished through the efforts of the company's research department. Continued refinements have been made in all of the plant machinery since the first mill run in October, 1921, at which time the news dispatches from New Orleans carried the story of the "Biggest board in the world, nine hundred feet long by twelve feet wide."

Efficient Baling Stations

A typical example of these improvements is seen in the new and highly efficient baling stations of which there are some thirty located on the properties of the company. Baling was one of the first difficulties experienced. For purposes of transportation and storage it is essential that the great stacks of loose bagasse which come from the sugar mills be compressed and baled, much as a bale of hay. These bales are then shipped to the mill at Marrero and stacked mountain high.

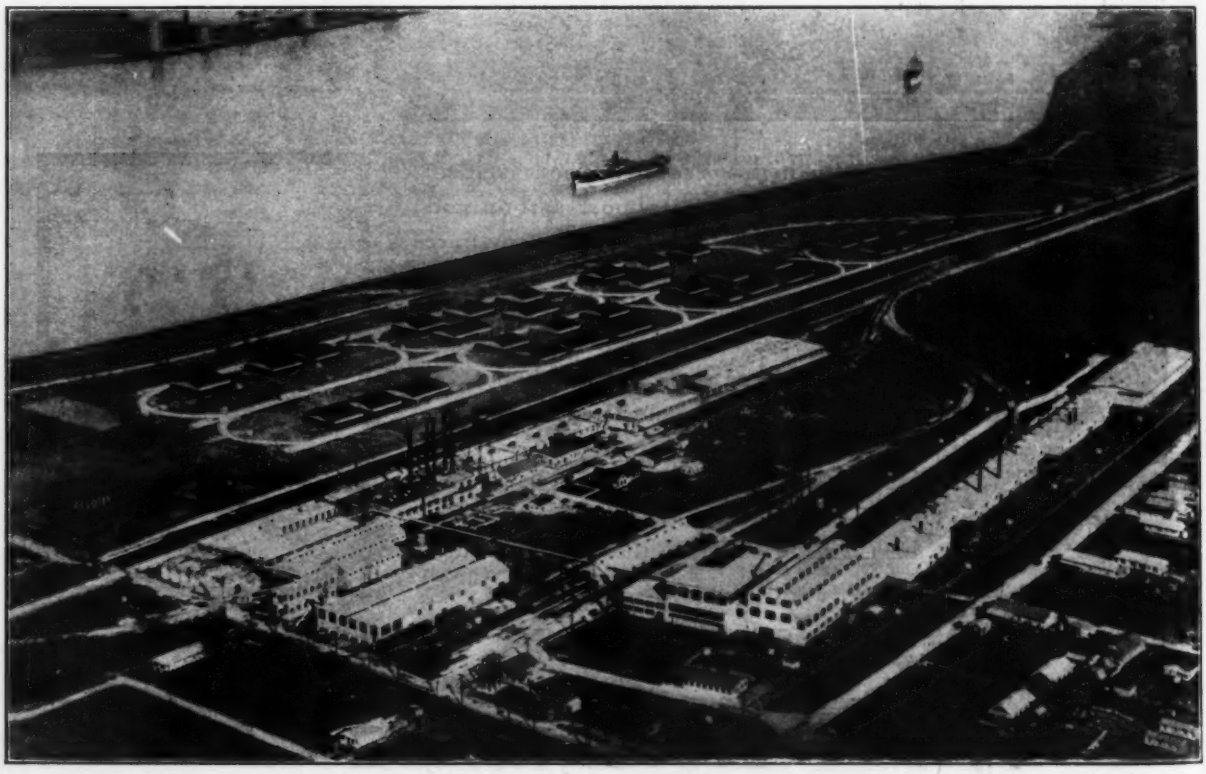
Simple as this baling process might seem to the uninitiated, the company experienced great difficulty with its first balers. The tough, fibrous stalks of the crushed cane refused to be pressed into compact bales by an ordinary baler. Constant work by the engineers of the research department have since perfected these machines which are located in groups of five or six to a baling station.

Bagasse Piled Mountain High

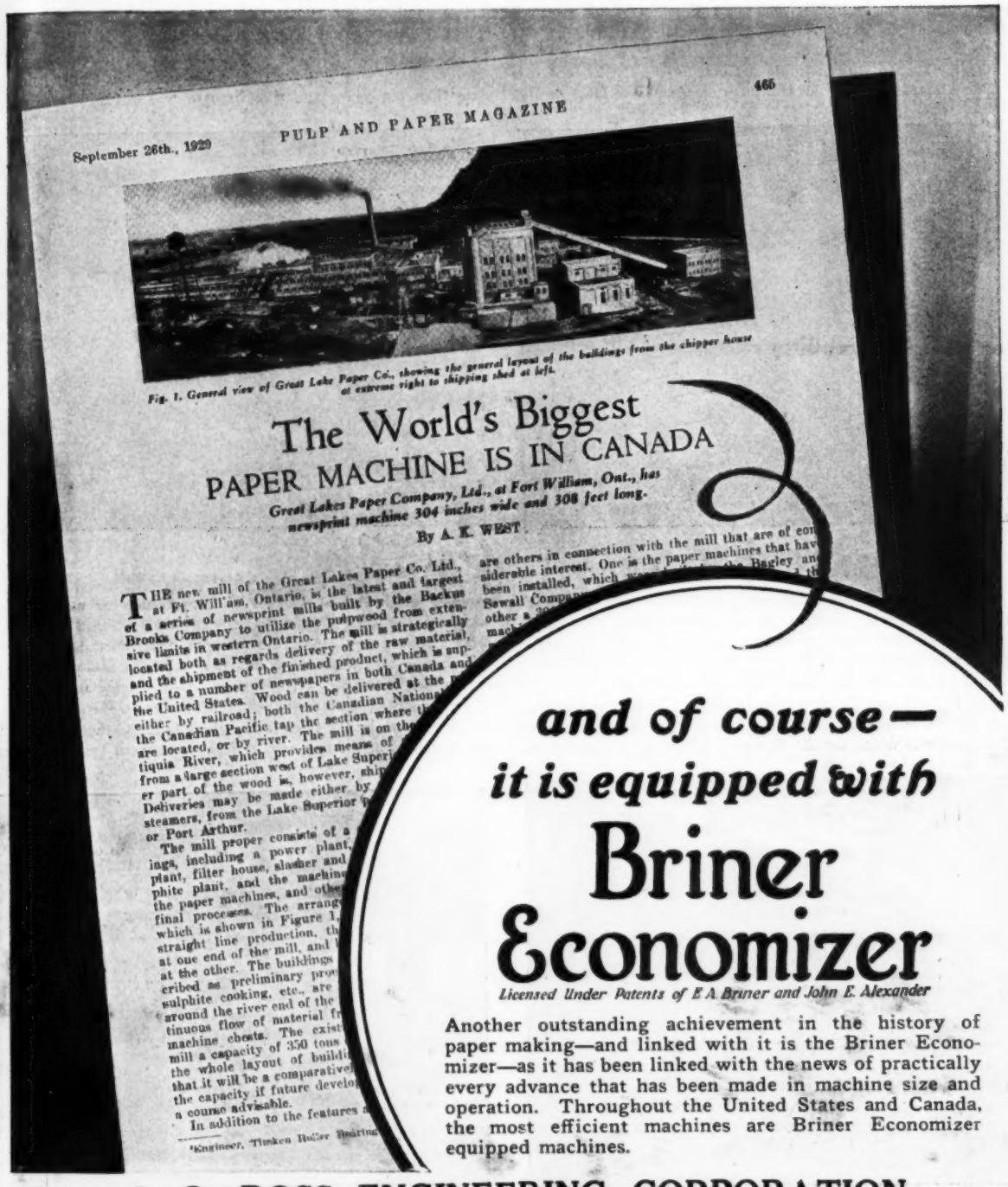
The great bales of bagasse are piled mountain high at the Celotex mill during the season of sugar cane cutting, for it can be readily seen that the amount of raw material necessary for the manufacture of 500,000,000 square feet of board is enormous. As the time between seasons passes the mountain is carried away bale by bale. A steam hoist pulls them down, loads them on to a dummy train which deposits the bales at the mill. Here they are ripped open and the loose bagasse carried by a special conveyor to the huge rotary digesters.

Constant Chemical Tests

The cooking process drives off any impurities or sugar left in the crushed cane waste and prepares the material for the felting machine. Tests are made all along the line by the mill chemists which assure a constant standard. In fact one man out of every



AIRPLANE VIEW OF THE PLANT OF THE CELOTEX CO., MARRERO, LA.


September 26th., 1929
PULP AND PAPER MAGAZINE
466
Fig. 1. General view of Great Lake Paper Co., showing the general layout of the buildings from the chipper house at extreme right to shipping shed at left.
The World's Biggest
PAPER MACHINE IS IN CANADA
Great Lakes Paper Company, Ltd., at Fort William, Ont., has newsprint machine 304 inches wide and 308 feet long.
By A. K. WEST.
THE new mill of the Great Lakes Paper Co. Ltd., at Ft. William, Ontario, is the latest and largest of a series of newsprint mills built by the Backus Brooks Company to utilize the pulpwood from extensive limits in western Ontario. The mill is strategically located both as regards delivery of the raw material and the shipment of the finished product, which is supplied to a number of newspapers in both Canada and the United States. Wood can be delivered at the mill either by railroad; both the Canadian National and the Canadian Pacific tap the section where the limits are located, or by river. The mill is on the Kaministiquia River, which provides means of transport from a large section west of Lake Superior. A large part of the wood is, however, shipped by rail. Deliveries may be made either by rail or by lake steamers, from the Lake Superior ports of Fort William or Port Arthur.
The mill proper consists of a group of buildings, including a power plant, a groundwood plant, filter house, slasher and barker house, sulphite plant, and the machine room containing the paper machines, and other buildings for the final processes. The arrangement of the mill, which is shown in Figure 1, is designed for straight line production, the wood being received at one end of the mill, and the finished paper at the other. The buildings are arranged as described as preliminary processes, groundwood, sulphite cooking, etc., are grouped around the river end of the mill to secure continuous flow of material from the barkers to the machine chests. The existing mill has a capacity of 350 tons per day, and the whole layout of building and equipment is such that it will be a comparatively simple matter to increase the capacity if future development should make such a course advisable.
In addition to the features of the mill proper, there are others in connection with the mill that are of considerable interest. One is the paper machines that have been installed, which were built by the Bagley and Sewall Company, and the other a
'Engineer, Timken Roller Bearing

and of course—
it is equipped with

Briner Economizer

Licensed Under Patents of E A Briner and John E. Alexander

Another outstanding achievement in the history of paper making—and linked with it is the Briner Economizer—as it has been linked with the news of practically every advance that has been made in machine size and operation. Throughout the United States and Canada, the most efficient machines are Briner Economizer equipped machines.

J. O. ROSS ENGINEERING CORPORATION

208 W. Washington Street, CHICAGO
Main Office—122 East 42nd Street, NEW YORK
519 American Bank Bldg., PORTLAND, ORE.

ROSS ENGINEERING OF CANADA, LIMITED

NEW BIRKS BLDG., MONTREAL

ROSS SYSTEMS
HEATING—VENTILATING—DRYING

eleven working at the mill is under the direction of the research department. It is through their efforts that the high Celotex quality is always maintained.

From the start of the boarding machine to the finish where the completed board is turned out ready for shipment is a long journey

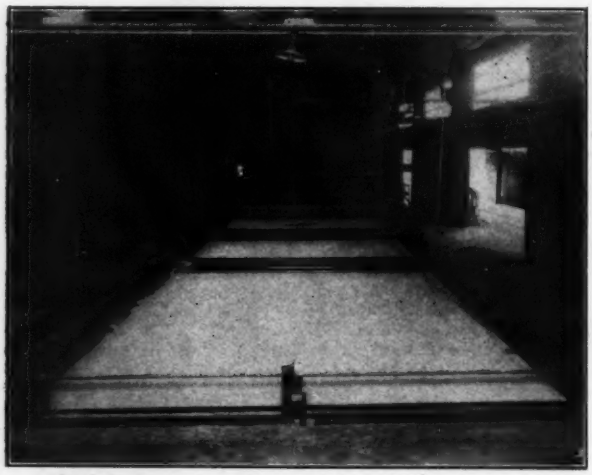


FIG. 1
Cutting the 12 ft. board into three sections.

of approximately one thousand feet. The board as made by this machine is twelve feet wide. Special cutters divide this twelve foot width into three sections of four feet each, while a traveling mechanical duck darting back and forth across the board cuts it into lengths varying from seven feet to twelve feet.

All of the different Celotex cane fiber board products are variations of this board. At the present time there are some seven distinct products which include Standard Board, Lath, Roof Insu-

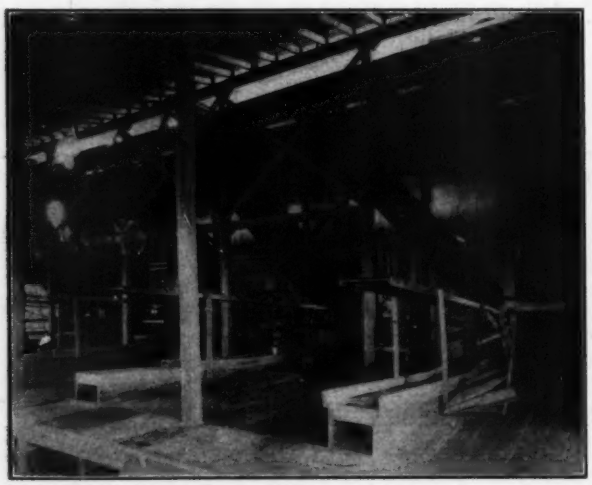


FIG. 2
New and Greatly Improved Baling Station.

lation Board, Special Refrigerator Insulation Board, Carpet Lining, Linoleum Base and Rug Liners, Industrial Board and Acousti-Celotex. The liners for floor coverings all come under the same general classification, the Linoleum Base being cut thinner than the Carpet Liner.

Acousti-Celotex, which is used for sound control, is Celotex board cut into square tiles and perforated with holes. A special drilling machine is used for making the holes which absorb and break up the sound waves which otherwise would strike against a flat surface and rebound.

The future uses of cane fiber products and the development of new products will be governed by the economic demand. It was less than ten years ago that bagasse was regarded as a waste

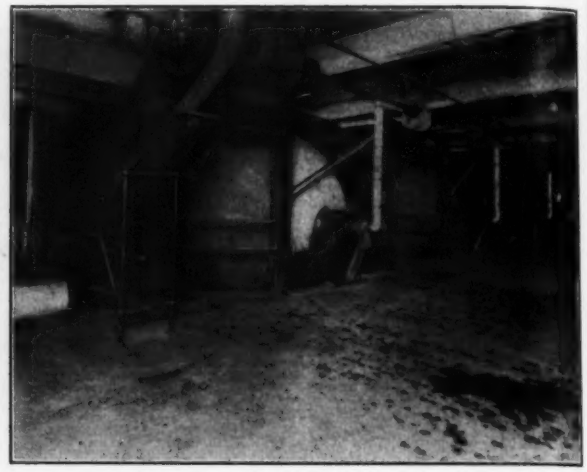


FIG. 3
Rotaries Where Bagasse Is Cooked.

product which at best was an indifferent fuel for use under the sugar mill boilers. Celotex has shown and developed many of its most valuable uses. And the research department is always experimenting and working to find new products and new uses for the old products.

Many fibrous plants have been used in the conduct of these experiments both by the scientists of the Celotex Company and other companies. But the one vital difference between bagasse and any

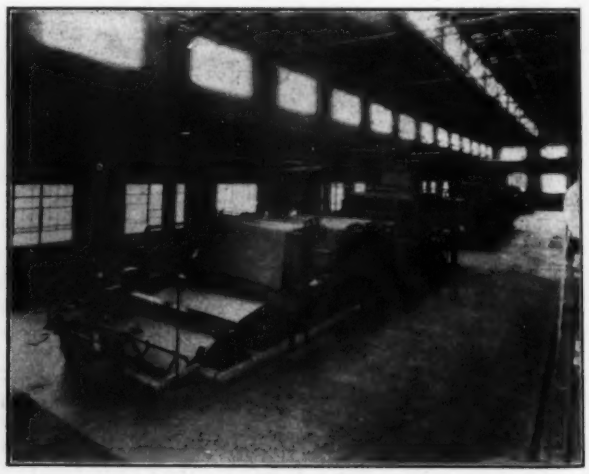
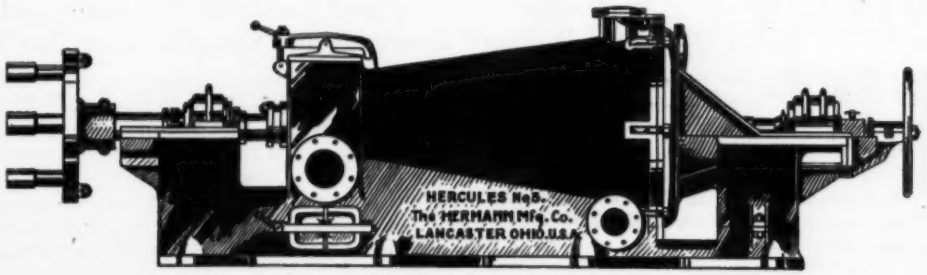


FIG. 4
Seventh Board Machine Recently Installed.

other fibrous plant, from the economic point of view, is the fact that sugar cane is all grown within a certain limited range. From the cane plantations it is taken directly to the sugar mills and the bagasse which remains after the extraction of the sugar is easily collected, baled and shipped.

Because of the fact that the cane plantations and the sugar mills are all within a limited and definite territory, the matter of collecting and shipping is greatly facilitated.



PERMANENTLY MOUNTED Roller Bearings

THE Hercules, with its one piece assembly, is the most economical Jordan obtainable. It costs no more than the old babbitt bearing type and will save enough in added economy of operation and maintenance to pay for itself in twenty-eight months. By using our trade-in plan, the Hercules Jordan will pay for itself in less than twenty-four months.

The one piece assembly, with its roller bearings permanently mounted upon the shaft, is an exclusive patented feature that cannot legally be duplicated by any other manufacturer. There are a number of other distinctive advantages that make the Hercules Jordan superior in every particular.

Installation Without Cost

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The Hercules Jordan will stand the test of time and use. This Jordan is built to render a superior service in every way. If we cannot prove the facts mentioned above, the installation costs you nothing and the Jordan may be re-shipped to our factory.

You are invited to use our engineering department as an aid in solving your Jordan problems.

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THE HERMANN MANUFACTURING CO.
LANCASTER, OHIO

Crown Willamette Expands Mill At Camas

Improvements Now in Progress Include Installation of Three New Paper Making Machines, Rebuilding of Four of Present Nine Machines, New Band Saw Mill, Chipping and Chip Handling Facilities, an Additional Digester, Bleaching and Electric Generating Plant

The improvements now in active construction at the Camas, Wash., mill of Crown Willamette Paper Company on the Columbia River above Portland, Ore., include a new band-saw mill, chipping and chip handling facilities, an additional sulphite digester, a bleachery, three new paper machines, rebuilding of four of the present nine machines, a toweling, toilet, and napkin paper converting plant, additional water filtration equipment, and a new steam electric generating plant.

It is intended that this property shall cease to be a news print producer, and that the customary fruit and ground wood-filled tissue, sulphite and kraft wrapping and converted bag tonnage shall be increased, as well as to enter the field of bleached specialties and personal utility papers, converted and packed in attractive forms ready for distribution to the public. Emphasis is placed upon cleanliness and brightness of these goods in addition to meeting the most exacting customer specifications in other respects.

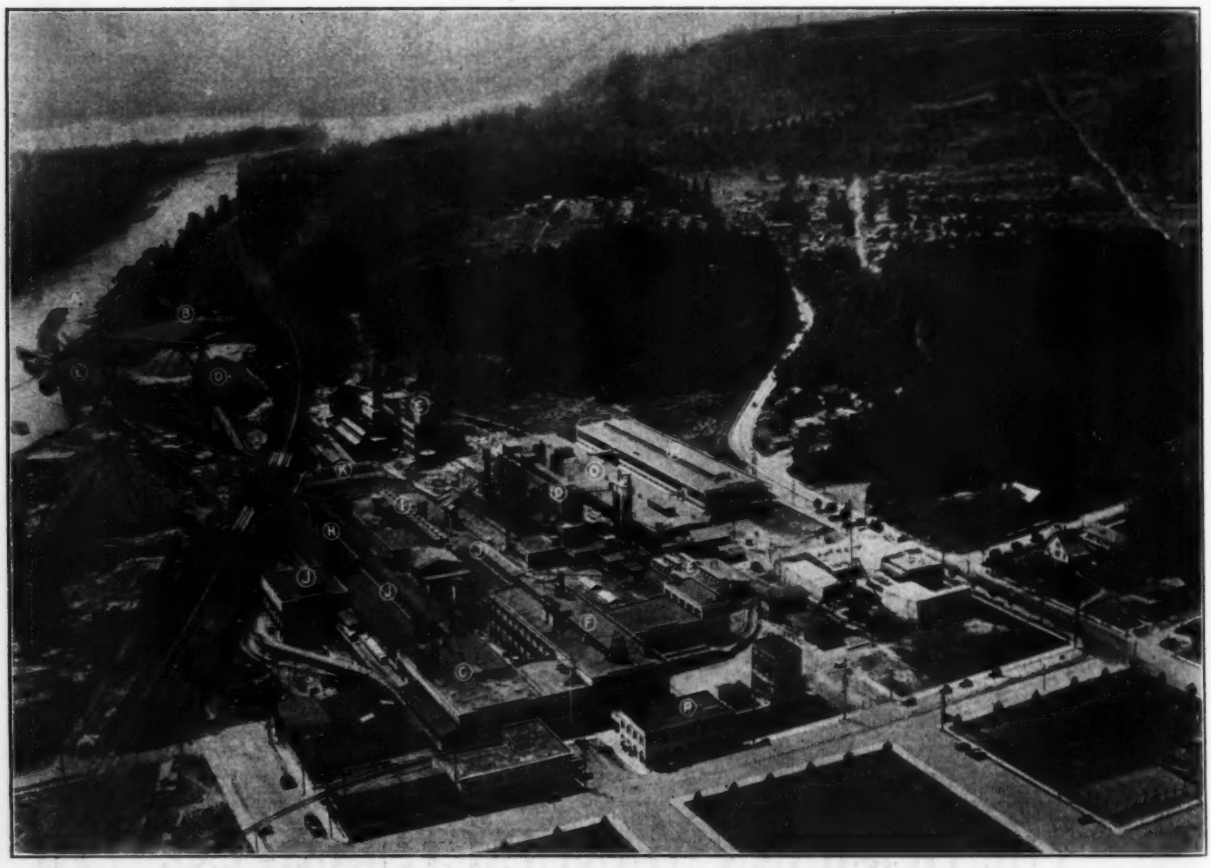
Wood Mill

This project is typical of the evolution increasingly rapid in progress of Pacific Coast pulp and paper mills. The present drag and circular swing saw and steam splitter arrangement, while being retained in part, is being augmented by the breakdown type of mill wherein hemlock and spruce logs will be sawed into cants. The direct connected motor driven band saw mill will handle 32-foot logs as large as 8 feet diameter. Longer logs will be bucked in the water by floating equipment. Large logs will be hoisted vertically from the water, and will be run through the break-down side. Small ones will be transported up the present inclined log haul to the drag saw and splitter side of the enlarged wood mill.

The problem of dirty wood versus speckless paper is attacked at its very source and each form of wood is to be passed through the most effective equipment for cleaning it up.

Chips

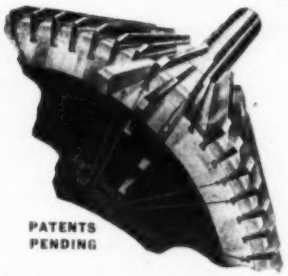
Clean wood is flumed from the wood mill through existing facilities to the new chipping plant and to the grinding room. Wood intended for chipping is discharged from the flume to a horizontal conveyor flight from which it is diverted selectively with respect to the grade of chips desired to the spouts of the six chippers, arranged in three pairs. Each pair of chippers discharges to a horizontal belt from which bucket elevators raise the chips to the



AERIAL VIEW OF THE CAMAS, WASH., PLANT OF THE CROWN WILLAMETTE PAPER CO.

(a) Rafts of Pulp Wood Logs, (b) Wood Preparing Plant, (c) Sulphate Pulp Mill, (d) Sulphite Pulp Mill, (e) Ground Wood Pulp Mill, (f) Machine Room—two paper machines, (g) Machine Room—two paper machines, (h) Machine Room—two paper machines, (i) Machine Room—three paper machines, (j) Beater Rooms—three, (k) Finishing Room, (l) Shipping Dock, (m) Bag Factory and Paper Converting Plant, (n) Stacks Storage Pulp, (o) Warehouses—two, (p) General Mill Offices.

Slash renewal costs 30-50% with Bolton Inverted Wedge Plugs



Section showing the construction of the Bolton Inverted Wedge Plug. Knives or woods cannot work loose. Knives are lock-slotted entire length of plug; easily and quickly removed when replacement is necessary. Wedges and knives are driven in from the end.

Tested for more than 5 years under the severest kind of service in chip board and coarse waste paper mills,—where old style plugs used to last 4 to 6 weeks, the Bolton Inverted Wedge Plugs have run 12 months without a stop. Mills that formerly used solid cast manganese plugs, are replacing with Bolton Plugs and obtaining large savings due to reduced renewals, maintenance and power costs.

Read This Letter

The Superintendent of a container board mill using *hot water* writes:

Inverted Wedge Plug Construction

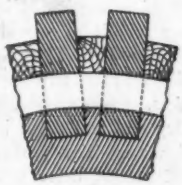
Wedge woods larger at bottom than at top, solid wood, no notches. Woods or knives cannot come out. Chipping does not weaken support of knives. Inverted wedge woods are the base of service received. Chip as much clearance as wanted, as many times as you wish—woods cannot be weakened. One plug takes any size knife.

"We had only been running a Jordan Filling from two to six weeks. We never wore them out but tore them out. We are running these Bandless Plugs continuously and are securing from four to six months' wear out of each Jordan without any trouble. We find that our Jordan repairs have been reduced from 100% to 33%.

"The construction of the bars is such that there is no spring, eliminating entirely the tremendous vibration of the old style Plugs. We put about twenty-five tons of stock per day through each Jordan and are pulling about 175 H.P. on each motor so that the bars certainly must be of a very high quality and construction to stand this tremendous pressure."

* * *

You can reduce machine room costs and insure steady, dependable production with Bolton Inverted Wedge Plugs. They pay for themselves out of the savings they make. Made to fit any Jordan, write for full information and prices.



Ordinary Plug Construction

Wood wedges larger at top than at bottom, nothing to prevent working loose and washing out. Knives up on stilts, supported at only a few points, chipping seriously reduces and weakens support.

John W. Bolton and Sons, Inc.

LAWRENCE : : : MASSACHUSETTS

3433

vibrating screens which are arranged in tandem, a pair to each pair of chippers.

From the vibratory screens the slivers and oversize chips return to a breaker which returns them for rescreening to the kraft chip screens. The sawdust and smaller chips pass to a second set of vibratory screens which separates sawdust from the small chips. The smallest chips will be used for kraft pulp and the sawdust will pass for fuel to the new boiler room.

A large bin is being added in which to store sulphite chips for the new digesters. This bin will be fed by a belt conveyor which travels on to the present sulphite chip storage bins. A new belt conveyor delivers kraft chips to the present two circular steel storage tanks. This conveyor is fully housed and will handle chips with minimum of crushing and so as to be thoroughly protected from extraneous dirt.

Sulphite Mill

The unbleached pulp department of the Sulphite Mill is being augmented by a new 19-foot diameter, 58-foot high digester of sufficient volume to cook 26 tons. This is one of two units which a new building is being constructed to house. The blowpit for the new digester is of reinforced concrete lined with tile. The drainer bottom is of perforated wood. The vomit stack above the blowpit roof level is of wood.

Additional acid recovery tanks, acid cooling facilities, and another sulphur burner are being provided. This equipment is being installed to assure a high test acid, with minimum loss of chemicals.

The new digester and two of the present digesters will be piped up so that a special easy bleaching stock can be produced separately from the sulphite stock that is to be used unbleached.

As of first necessity to an effective bleaching operation extensive screening and gravity riffling facilities are being provided for the raw stock to be bleached. These with the bleaching and washing equipment are housed in a new three story bleachery building of reinforced concrete construction. Immediate provision of the necessary liquid chlorine apparatus for the preparation of bleach liquor, high density bleaching tubs, blowers, thick stock conveyors and filter-washers is being made for single-stage bleaching of 100-150 tons of pulp daily. Provision is made for the future operation of additional equipment to accomplish double stage bleaching if desired.

Extensive provision of slush pulp storage tanks is being made to avoid the expensive necessity of lapping pulp on wet machines during periods when the supply exceeds the demand, which subject as to ground wood pulp impinges upon that of heat and power balance mentioned below.

Paper Machines Nos. 1, 2, 3 and 4

The wet ends of two Harper Fourdrinier Machines (No. 1, the wire of which is 134 inches in width, and No. 2, 114 inches) are being rebuilt to provide for running fine 10 lb. tissue papers at higher speeds. These improvements include lengthening the wires to 65 feet each, new copper lined head boxes, high speed adjustable shakes, spring support of breast rolls, etc.

Dry end and drive improvements of Nos. 1 and 2 include new and wider drier gears with cut teeth, new enclosed steel spiral bevel section drive gears running in oil and mounted in roller bearings. Sections will be engaged by magnetic clutches push button operated from the fronts of the machines. The present line shafts, bearings and alternating current motor drives will be retained but new taper pulleys installed.

New slitter shafts in roller bearings and six double edge slitter hubs complete the rebuilding of these machines.

A 124-inch wrapping paper Fourdrinier machine (No. 4), engine driven, is continued in operation unchanged. An existing 85-inch news print machine (No. 3) is being displaced by a new 137-inch straight Fourdrinier high speed machine for fruit wrap and tissue production.

The new No. 3 machine is typical of the best conservative design for the desired product. The wire is 65 feet long and the fourdrinier part from the breast roll inclusive of table rolls, suction boxes, guide roll, wire rolls and savealls but not the couch rolls are removable by motor drive as a unit on rails into the tending aisle, to facilitate changing of wires. The Fourdrinier is adjustable vertically also by motor drive at the guide roll through a distance from 2 inches below to six inches above level.

The slice is of special design for light weight papers including a motor driven perforated submerged roll. Separate from the removable Fourdrinier part and beneath the suction box area of the wire is a fixed sheet metal saveall tray with spout back of the return wire discharging into the wire white water pit.

Eighteen driers 60 x 134 inches and one 36-inch drier overhung toward the press with a rubber covered top roll for returning the top pickup felt, a rope carrier, a four roll calender stack, uniform speed reel combination winder and slitter comprise the dry end of the new No. 3 machine. The first and last three bottom and the last top drier are equipped with long shaft brass bladed doctors and the last top drier is equipped with an internal cold water shower.

Each section of the machine is driven from the line shaft through hardened cut steel bevel gears running in oil baths, and actuated by magnetic clutches push button operated from the front of the machine. The lubricating system includes an oil circulating pump and oil filter. Driers are driven by shrouded chains from the sprockets on the section shafts.

The line shaft is driven through cast iron taper pulley belted to a direct current motor, current for which is supplied by an alternating current motor driven generator.

Rebuilding Machine No. 5

The present 152-inch Fourdrinier machine, No. 5, hitherto used for the production of news, medium to light weight sulphite and kraft wrapping papers, is being rebuilt to produce bleached sulphite specialties of greater tonnage. These changes comprise a removable Fourdrinier part similar to that of the new No. 3 machine, and of the same materials including head box, high speed slice with rectifier roll, breast roll, table rolls, wire roll and breast roll doctors, saveall tray, motor driven shake adjustable for speeds of 450 to 700 feet per minute. The present suction boxes are being retained but provided with an oscillating mechanism. Suction couch and first press rolls not previously included in this machine are being provided.

A new uniform speed reel with three spools, all mounted in roller bearings and a pair of unwinding stands with friction arrangement for winding from the new spools onto the present winder are being provided. No other changes of the dry end of this machine are being made except to provide new pulleys to drive the new and larger couch first press rolls and reel.

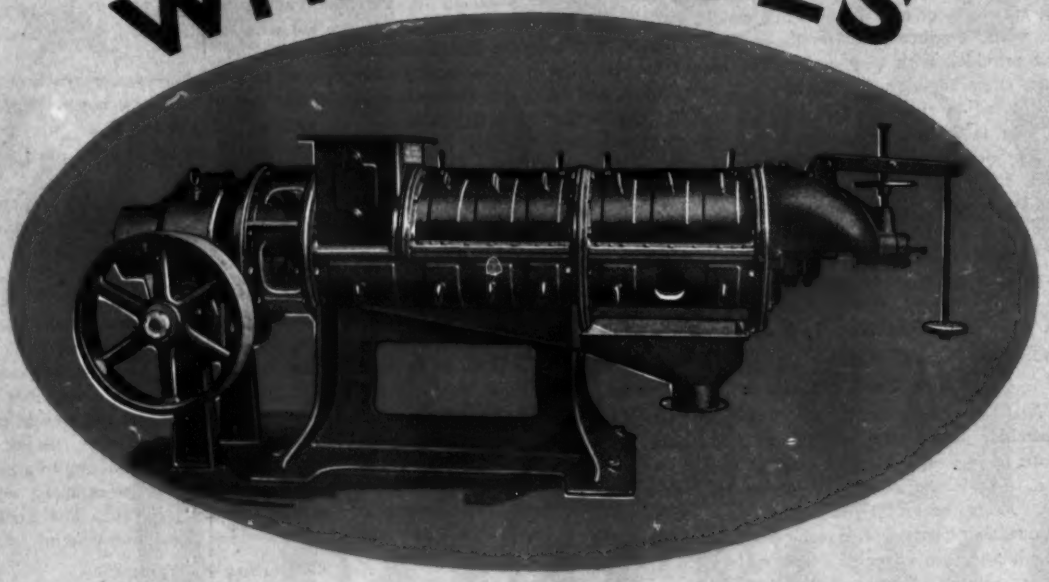
Rebuilding Machine No. 6

This 187-inch Fourdrinier machine is being rebuilt for higher speed to produce increased tonnage of kraft wrapping papers and bag stock. A new patented slice is provided with a rectifier roll arranged for adjustment while the machine is running.

The length of the wire is increased from 80 to 96 feet. The Fourdrinier part is being rebuilt but not into the adjustable and removable type as for Nos. 3, 5 and 11. It will, however, be provided with a new motor driven shake, wire rolls, additional table rolls and a new breast roll with sprint supports. The shake rails will be of steel designed for strength with lightness, supported on heavy cast iron posts and springs. All shaking parts will be mounted on flexible supports to avoid wearing surfaces.

This improvement includes suction couch and first press rolls, the machine not previously having been so equipped. Between them will be a ball bearing mounted aluminum roll for regulating the draw of the paper which will be blown from the couch to the press felt. The old bottom gun metal cased couch roll will be used as a bottom smoothing roll between the third press and the first drier and the rubber covered roll formerly the first press bottom will serve as the top smoothing roll in the new location arranged

WHAT DOES



The Valley Voith Screw Press Do?

This machine removes liquids from pulp. It replaces wet machines, deckers and filters, and is a departure from present used methods.

OTHER VALLEY EQUIPMENT

Jordan Engines
Beaters, Breakers, Bleachers & Washers
Flat and Rotary Screens
Screw Presses
Voith High Pressure Stock Inlets
Centrifugal and Stuff Pumps
Laboratory Equipment
Stock Valves—Gate and Plug
Stock Consistency Regulator
Special Machinery

THE SCREW PRESS HAS THESE ADVANTAGES:

1. LOW INITIAL COST.
2. LOW LABOR COST.
3. ELIMINATES WIRE, FELTS AND AUXILIARY EQUIPMENT.
4. MORE CAPACITY.
5. SMALL AMOUNT OF POWER.
6. LESS SPACE.

11 SUCCESSFUL INSTALLATIONS ARE IN OPERATION.

Complete Information gladly furnished by the Valley Iron Works Company, Appleton, Wisconsin.

VALLEY

Equipment for Paper and Pulp Mills

New York Office: 350 Madison Ave.
Pulp & Paper Mill Accessories, Ltd., Montreal, Canada, Canadian Representatives

in such manner that a marking roll may be added later if required. The present second and third press will be used unchanged but relocated.

Six new driers will be added to this machine. The present calender, reel and winder will be retained, the latter fitted with a new slitting arrangement with 18 saws and collapsible shafts. The present line shaft, lengthened to suit the machine changes will be retained but provided with new pulleys for higher speeds. The present steam engine driving this machine will be retained, and its performance eased by the fact that the wet end journals of the breast roll, new table rolls, wire, couch and first press rolls will be mounted in new roller bearings instead of ordinary journal boxes.

Each variable speed section of the machine, consisting separately of the couch, first, second and third presses, smoothing press, two sections of 17 driers each, calender and reel will be driven by new improved cut steel spiral bevel gears, fully enclosed and running in oil.

Machines Nos. 7, 8 and 9

Present machines Nos. 7, 8 and 9 will remain undisturbed.

New Yankee Machine

Machine No. 10 is being provided to fulfill the demand for a variety of machine glazed plate marked and felt striped specialties of medium to light weight bleached and unbleached sulphite and kraft papers. The Fourdrinier wire will be 132 inches wide and 65 feet long. From the breast roll to the couch, exclusive of the latter, the Fourdrinier part is removable into the tending aisle as a unit to facilitate wire changes. It is adjustable vertically so that the breast roll may be raised 2 inches above or lowered 6 inches below the level of the wire guide roll. The double slice is of improved, papered design.

Machine No. 11

This new machine installed to produce 25 tons of 10 lb. toilet tissue paper daily is built for a fourdrinier wire 175 inches wide and 75 feet long; except that it is provided with creping mechanism its materials of construction are the same and the dimensions of its parts proportional to new machine No. 3 described above.

Paper Machine Buildings

No structural alterations are necessary to the rebuilding of machines Nos. 1 and 2. The installation of new No. 3 machine necessitates the removal of the creping machine which occupied space in the same bay as the old No. 3 machine. The consequent structural alterations of this building in which the present machine No. 9 also is located consist of the machine No. 3 foundations, white water and couch stock chests, felt tightener pit in the basement and a portion of new concrete main floor.

The rebuilding of machine No. 5 requires new foundations, couch pits, etc., for the wet ends, new screen and filter foundations. Rebuilt No. 6 machine requires additional structural columns, couch pit, new machine girders and calender foundations.

New No. 10 machine requires the roofing cover of the court area between the buildings in which machines Nos. one and two are located on the south and Nos. 9 and 3 on the north. This space is to be filled with concrete foundations for machine No. 10 and auxiliaries with a steel and concrete superstructure and the open end closed by a new concrete outside wall with large windows.

New buildings of reinforced concrete construction are being erected to house the new machine No. 11 (in such a manner as easily to be widened to provide space for future No. 12 machine), and west of the Kraft Beater Room to provide space for locating eight additional beaters.

Paper Machine Auxiliaries

The new beaters are for beating Kraft stock exclusively for paper machines Nos. 4, 6 and 10. They are driven in pairs by motors located on the main floor, beneath which the chests for beater stock and white water will be located. The balance of the new beater room basement floor space will be occupied by machine shop equipment.

The kraft beaters are of 2,000 lb. capacity, have stone bed plates and corrugated steel fly bars. Two beaters of the same type are provided for the new Yankee machine No. 10 and two each of the same general type but with stainless steel fly bars are provided for new machines Nos. 3 and 11.

One new Jordan coupled to a 350 horsepower synchronous 2,300 volt motor is provided for each of the new machines Nos. 3, 10 and 11. The ones for machines Nos. 3 and 10 are steel filled with special duplex plugs. The No. 11 jordan is brass filled with plain bars.

Stock will be pumped through Warner equalizers to assure even consistency before passing to paper machines. The equalizers will discharge stock directly into the jordans below, before it passes to the screens.

Two Bird screens with copper vats will be installed on each new paper machine. These will be driven by direct connected motors through worm reduction units, one motor driving both screens. Rejects of these screens will pass to four plate flat screens. These four plate screens are at present installed on machines number four, five and six. The four plate screens on the present machines will be replaced by new eight plate flat screens. Stock will be piped directly to each screen so as to reduce foaming to a minimum.

Each machine, both new and old, will be equipped with condensate removal and moisture control systems. The Yankee machine will be provided with a vapor absorption system.

Converting Facilities

A converting plant 200 feet wide by 250 feet long will be constructed for the converting of toilet paper and towels in which will be installed towel machines and toilet paper machines. Tracks will be constructed adjoining the plant for rail shipment of products and the mill tramway system will be extended so that the converted products may be transferred to boats for water shipment, or so that bags, counter rolls and other products may be carried from the several parts of the paper mill to the converting plant for mixed shipments as required.

Paper will be conveyed by electric trucks from the paper machines to the plant, and a covered runway including a tunnel under the railroad tracks will be constructed for this purpose.

The latest ideas in portable conveyors have been adopted in the converting room and warehouse. These conveyors are to be arranged so that there will be a quantity of empty cartons adjacent to each machine which will be accessible to the operators. The cartons will be placed on small roller loading platforms near each machine and when packed can be easily transferred to the main gravity conveyor.

All cartons gravitate to a central scale and will then pass to the storage room adjoining the converting room or to railway or tramway cars as desired. The system also allows part of the products to go into storage and part to cars, or to load cars with cartons both from storage and from converting machines if desired. Practically any combination of handling methods desired can be obtained.

The building will have concrete floor and walls and wood roof, one story in height except along the railroad track where a core machine for producing the paper cores for the roll toilet machines will be installed on a second floor which will be constructed for this length of the building alongside the railway tracks. Cores will be conveyed to each roll toilet machine. The office and locker rooms will also be located on this second floor.

Water Supply and Water Power

During half of the year all water is received by gravity flow from La Camas Lake nearby, which is fed by mountain streams. Two water wheels connected to wood pulp grinders are driven from this source. During natural low lake water periods Columbia River water is pumped up to the forebay which flows from the

A LEADER for LEADERS

WITCO PARIS BLACK

American paper makers have established a standard of excellence second to none. How? By selecting good raw materials, for one thing . . . by carefully avoiding any quality save that of the scrupulously excellent.

Witco Paris Black has earned a place on exacting specification sheets. Witco quality is an established fact, maintained by skillful technical control of fine processing.

You will like Witco Paris Black, which contributes to efficiency in your production. Witco's position as direct factors introduces an added economy note.

Other WITCO quality products for paper

BLANC FIXE
CARBON BLACK
FRENCH OCHRE
SPANISH OXIDE
EARTH COLORS
UMBERS
VAN DYKE BROWN
SAP BROWN

Buy Direct and Profit Directly

WISHNICK-TUMPEER, Inc.

MANUFACTURERS AND IMPORTERS

CHICAGO · 365 E. ILLINOIS ST. · NEW YORK · 251 FRONT ST. · AKRON · 1101 AKRON SAVINGS & LOAN BLDG.

TRENTON · BOSTON · MILWAUKEE

WITCO owned and operated Century Carbon Co. and the Pioneer Asphalt Co.

lake. Three of the four inducing motor driven pumps, each of 5,500 gallons per minute capacity, used for this service, are being retained, supplemented by a new 15,000 gallon per minute pump similarly driven.

Pressure Filters Being Repiped

Four existing pressure filters are being repiped and augmented by sixteen new ones each 8 feet in diameter, 25 feet long. Pretreatment and sedimentation facilities are provided through which passes all of the water from lake and river, and from which that not requiring filtration is diverted for mill uses. Lake water for the wheel penstocks is delivered before reaching the sedimentation basins which with the filters are located up a hillside 1,000 feet from the mill. About 40 million gallons will pass through the sedimentation system of which about 16 million gallons are filtered daily. About 1,800 horsepower is developed from the lake during the six months yearly from surplus flows above the requirements of the paper and pulp mills and steam power plant.

Steam and Electric Power

Such steam engine drives as exist, developing a total of about 2,300 horsepower, will be retained, but no more added. Present steam electric power is rudimentary, consisting only of that of a 750 kilowatt condensing turbo-generator operated normally to generate alternating current for driving the Riverbank pump motors during the season of low outflow from the lake. The bulk of the load is carried by purchased hydroelectric energy from the Northwestern Electric Company.

A new steam-electric power plant is being provided to supply the increased demands of the enlarged mill for steam and electric energy. This plant is in a sense superimposed on the present boiler plant as regards steam pressure and is a forerunner of an ultimate high pressure installation. The latter will be superimposed on the steam cycle of the plant now under construction and at a pressure commensurate with the heat-energy ratio required by increased demands for steam and energy in the future expansion of the property.

Prime Movers

Prime-movers will consist of two double automatic extraction turbo-generators designed to bleed steam at process pressures and exhaust to vacuum. During normal operation these machines will pass the major part in of their full throttle flow to process via automatically operated extraction valves, a small amount passing through the low pressure end of the cylinder to carry fluctuations in the electric load to ventilate the vacuum stages of the turbine.

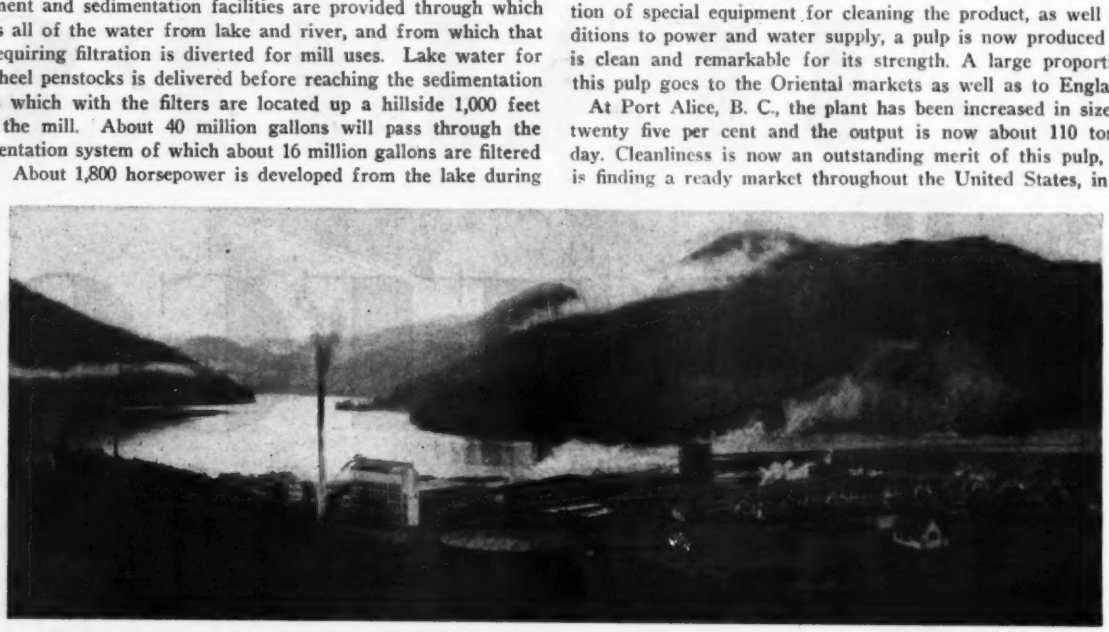
V. D. Simons, of Chicago, is the engineer and construction manager of this development, and H. A. Simons is his resident engineer at Camas.

British Columbia Plant Improvements

During the past three and a half years, British Columbia Pulp and Paper Company Ltd., manufacturers of sulphite pulps, have expended about one million dollars on improvements in their plants, with primary object of producing pulp of the highest quality. At the plant at Woodfibre, B. C., the output is now 115 tons per day of strong and easy bleaching sulphite pulp.

By the addition of improvements in mill control and the addition of special equipment for cleaning the product, as well as additions to power and water supply, a pulp is now produced which is clean and remarkable for its strength. A large proportion of this pulp goes to the Oriental markets as well as to England.

At Port Alice, B. C., the plant has been increased in size some twenty five per cent and the output is now about 110 tons per day. Cleanliness is now an outstanding merit of this pulp, which is finding a ready market throughout the United States, in Eastern Canada, and in the Orient, and is being used chiefly for high grade papers. While it is known that this company has been working on development plans, leading to power development and the expansion of their mills, no announcement regarding these plans has yet been made.



PORT ALICE PLANT OF THE BRITISH COLUMBIA PULP & PAPER CO., LTD.

Problems That Face Printing Industry

The varied problems that face the printing industry will be discussed and remedial measures will be suggested at a conference for technical men in printing to be held under the auspices of the American Society of Mechanical Engineers on November 7 and 8 at the Carnegie Institute of Technology, Pittsburgh.

The conference will be of international scope with prominent men in printing production in several foreign countries invited to attend. Delegates from England, Germany, Russia and Japan already have accepted the invitation to be present and to speak.

Recognized leaders in the printing trades in America will take part in the meeting, while the production managers of several of the larger newspapers have consented to speak. Twenty-two national and international organizations connected with all branches of the graphic arts have advised that they will cooperate by sending delegates to the meeting.

The two-day conference is being organized by the Printing Industries Division of the A.S.M.E., of which Edward P. Hulse is chairman. The recommendation for the conference was made by A. C. Jewett, chairman of the committee on Survey and Research. Mr. Jewett is director of the College of Industries, Carnegie Institute of Technology.

Wide interest has been shown recently in the problems that have hindered the printing industry and the conference is being organized with the idea of planning definite research steps.

Demand for Paper Livelier In Philadelphia

Fine Paper Manufacturers and Wrapping Paper Plants Are Particularly Busy At Present With Contract Shipments—New Supplies of Practically All Grades of Paper in Excellent Request—Philadelphia Paper Distributors Are Generally More Optimistic

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., October 27, 1929.—Livelier mill business is reported by a few of the important manufacturers who cater to the wrapping paper division and those fine paper mills featuring contract lots or volume shipments to heavy consumers of book and writing papers. Though the reported activity of wrapping papers and specialties is confined mainly to the larger distributors there has been a more optimistic attitude on the part of the trade as a whole. Despite efforts to clear out stocks that have been moving slowly demand for fresh supplies is improving.

Paper Trade Association Hears National Report

Members of the Philadelphia Paper Trade Association who attended the joint session of the fine and wrapping paper groups last Friday at the Benjamin Franklin Hotel, heard reports on the activities of the National Association convention held in Chicago earlier in the month. The meeting of both divisions of the trade was called by President Simon Walter, head of S. Walter, Inc., for the purpose of laying before the members the unusually interesting program which took place at the national gathering. There was full representation of the Philadelphia Association at the joint luncheon and business meeting. Leon Beck, of the Charles Beck Paper Company, delegate to the National Convention from the Fine Paper Division, read a complete report of the activities of the Chicago meeting, explaining the many factors that were taken up of importance to the local industry and to the trade at large. So interested were the local paper men in the report and the thoroughness and efficiency with which it was handled by Mr. Beck, that a unanimous vote of thanks was extended by the members.

S. Walter Inc. Opens Branch in Allentown

On November 1 there will be opened in Allentown, Pa., a large branch house of the Philadelphia concern of S. Walter, Inc., which will be the second subsidiary of that firm to be opened within recent times. The new branch to be established in Allentown will be strictly a fine paper distribution house and will be known as the Lehigh Valley Paper House Division of S. Walter, Inc. There will be carried here a complete assortment of papers produced by the Hammermill Paper Company, the Strathmore Paper Company, the Missisquoi Pulp and Paper Company, the George W. Wheelwright Paper Company, and the firm's own brand of Lehigh Valley Bonds.

Extends Philadelphia Warehouses

In order to take care of its expanding business, S. Walter, Inc., has added to its Quaker City warehouse facilities by annexing space in the warehouse adjoining Pier 78. The new addition provides for 20,000 additional square feet. The pier warehouse provides for direct railroad connection and docking facilities linked with the dock landing and connecting directly with the warehouse shipping platform so that the firm is supplied with adequate facilities to meet its incoming shipments by water.

Graphic Arts Building Planned

While there was announced in early summer plans for several paper houses to remove to the new Terminal Warehouse Building under course of construction at Broad and Race streets, another building has just been arranged to house printing, engraving and paper concerns under a single roof, to be erected at the southeast corner of 7th street and Washington Square and which will be known as the Graphic Arts Building. The building will be 14 stories high and will have a 200 foot frontage on Washington Square and a depth of 270 feet running through to Spruce street. It is designed to be the last word in construction and will be planned to carry large mechanical equipment used by the converting industries, printers and allied industries.

Grellet Collins, Jr., With International Paper Co.

Grellet Collins, Jr., son of Grellet Collins, Sr., head of the Dill & Collins Paper Mills, of this city, has been appointed a representative of the International Paper Company to cover its various mill properties. The younger Collins, who until two years ago was connected with the local Dill & Collins mills, has recently been connected with the Bryant Paper Company as paper chemist, developing new lines of paper made by that company. In his new connection with the International Paper Company he will travel over the mills, appraising the property and buildings and assets in all parts of the country.

Lang Paper Mills Open Own Saturating Department

The Lang Paper Mills, manufacturers of roofing papers and felts, recently moved to a new plant located in Gloucester, N. J., on the site of the old Pusey and Jones yards, after more than thirty years association with the Quaker City trade, have just added a saturating plant to the mills. The new saturating department is now running and is used for the mills' own felts and for the treatment of roofings. It is the first time in the history of the mills that the owners have conducted their own saturating plant, this work having been done under ouside contract. For the purpose of accommodating this new service in the roofing and felt production business an additional wing has been constructed on the site of the new plant in Gloucester and a saturating machine installed.

Philadelphia Gear Works Sponsors Meeting

Sponsored by George L. Markland, Jr., of the Philadelphia Gear Works, manufacturers of paper mill gears and others used in various industries, a semi-annual gathering of the American Gear Manufacturers Association was staged at the Benjamin Franklin Hotel last week. The meeting held for two days with an executive session on Saturday when Mr. Markland, of the Philadelphia Gear Works, addressed the meeting. There was tour of the plant of the Philadelphia Gear Works by the members and an address by Mayor Harry A. Mackey, of Philadelphia, on Saturday, at the luncheon hour.

Chicago Paper Market Conditions

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., October 28, 1929.—The last half of October finds normal conditions prevailing in the Chicago paper market. Here and there spotty conditions are reported but the only point of actual concern mentioned is the continued lack of water supply which is endangering the production possibilities of ground wood mills in the Middle Western territory. A fairly heavy rain during the past week, mixed with snow, offered only slight relief—nothing that would assist the mills, according to reports. Reports in the Chicago ground wood market have it that the Eastern mills have not been hit so hard by water shortage and Chicago representatives of this market are watching the moves of the Eastern mills with some degree of doubt.

The fine paper merchants had a splendid cold snap to help swell the week's totals for fine paper grades. The holiday rush season is not far off and the early beginning is already reported. Krafts and tissues are also almost ready for the holiday rush. Business went on unhalted by the antics of the stock market and news print distributors are finding plenty of advertising in the newspapers to buoy up that market.

Standardization Conference Held In Boston

Robert C. Fay, Director of Paper Users' Standardization Bureau, Discusses Application of Paper Standards to Individual Business—Miss Helen U. Kiely, of American Writing Paper Co., Tells of European Conditions and Discusses Methods of Testing Papers

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., October 24, 1929.—With 125 present, about twice the number attending a year ago, the first of a series of conferences scheduled for sixteen cities of the country under the auspices of the Paper Users' Standardization Bureau of the American Writing Paper Company, was held at the Hotel Statler, Boston, October 22. Members of the Eagle-A service houses in Boston—Arnold Roberts Company; Carter, Rice Co. Corp.; John Carter & Co., Inc., and Knight, Allen & Clark and purchasing agents of paper users were represented. The meeting was in line with the efforts of the Commerce Department and President Hoover to standardize business as much as possible.

Robert C. Fay, director of the Paper Users' Standardization Bureau, in opening the first session at four o'clock, briefly noted the establishment of the Paper Conference last year in Boston and the importance of standardization of papers. He referred to meetings to come in Washington, D. C., which will cover other papers besides bonds and ledgers.

Miss Helen U. Kiely, of the Department of Technical Control of the American Writing Paper Company, who spent the summer in Europe studying the standards of the Old World, said that in Europe the papers are either all sulphite or a combination of sulphite and ground wood. There is no attempt at standardization except in one form—a universal weight for all grades of paper. All papers are bought and sold on that basis. In regard to importation Miss Kiely said that the only papers we import are photograph, light conditioned, cigarette and fiber papers. Europe is shipping much paper to South America. It is difficult to visit European mills, not because the owners feel that callers will steal ideas, but because of their feeling in regard to their equipment and antiquated machinery. They think we are re-equipping and revamping all the time. In the European mills everything is saved; even the exhaust steam is used to cook bread for the employees on the premises. The apprentices go through nine years and the spirit of unrest is not so strong as it is here.

One of the most interesting mills is at Fabriano, Italy, established in 1537, where the paper is hand-made. Here they have an elaborate water-mark department, in which men with stilettos cut out nice designs. Miss Kiely showed one of these papers with a man's head as the watermark.

The speaker discussed standardization and making of paper from seven angles—raw material, processes, production, grade or quality, distribution, price and use. She called attention to the samples placed in boxes at the chairs in the room, containing rags, which make permanent papers, rag fibers, give long service, wood chips, which make temporary papers, and sulphite, which gives short service. Miss Kiely said that if she were to standardize bond paper she would eliminate anything under 50 per cent rag.

She discussed the methods of testing paper, including the folding test, saying that the United States Government used a paper for currency which had withstood 1,200 folds, but the number had been brought up to 3,600 folds. Any paper that has a high fold is well formed and will wear well. A folding test is now being applied to Bristols. The Pantone process, in which a mercury plate is used, produces a beautiful antique finish.

In weddings and papeteries one should be sure the paper will stand ink without blurring. Industrial paper, such as blue print paper, is all rags and must be sized carefully. In this the wet strength is of importance and care should be taken not to have iron in the stock so as to make a blue spot. Chart paper must be sized so as to take red and green inks.

In closing, Miss Kiely noted that the American Writing Paper Company was making 300 or 400 grades of bond and the number had been reduced to seven.

After the dinner moving pictures showed the manufacture of paper, Miss Kiely explaining them.

Mr. Fay discussed the application of paper standards to one's own individual business. He advocated never using more expensive paper than was necessary. Mr. Fay discussed also the contents of an envelope placed at each seat—charts, model forms and outlines to aid in purchasing printing and specifying paper on a basis of standardization of sizes, life and service. He cited examples in which great savings had been effected by standardization.

John A. Owen, assistant director of the Standardization Bureau, explained the automatic standardization file, stating that he had just finished a standardization for 80,000 forms, and was working on one for 252,000 forms. He had received many inquiries from professional men in regard to paper.

Mr. Fay showed advertisements from the *Saturday Evening Post*, which demonstrated that standardization is not confined to paper.

William H. Greenleaf, manager of sales promotion for Carter's Ink Co., emphasized the need of standardization in relation to carbon papers, especially for a particular job.

Mr. Fay took up the Eagle-A specification chart and also talked on the Ideal File of Direct Mail Papers. In his closing remarks, he emphasized the fact that there is no substitution for standardization. "The man who does not think and use standardization today is not in the stream of business."

News of the Wisconsin Paper Industry

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., October 24, 1929.—More than 1,500 "Keepall" machines are now in use in paper mills in various parts of the country. They are made by the Green Bay Foundry and Machine Works, of which Raymond A. North is president. The invention by Mr. North has grown in popularity, because of its value in conserving pulp otherwise discharged with waste from the mills. Mr. North has patents on twelve distinct machines for various industries and always has something in mind for improvement of paper mill operations.

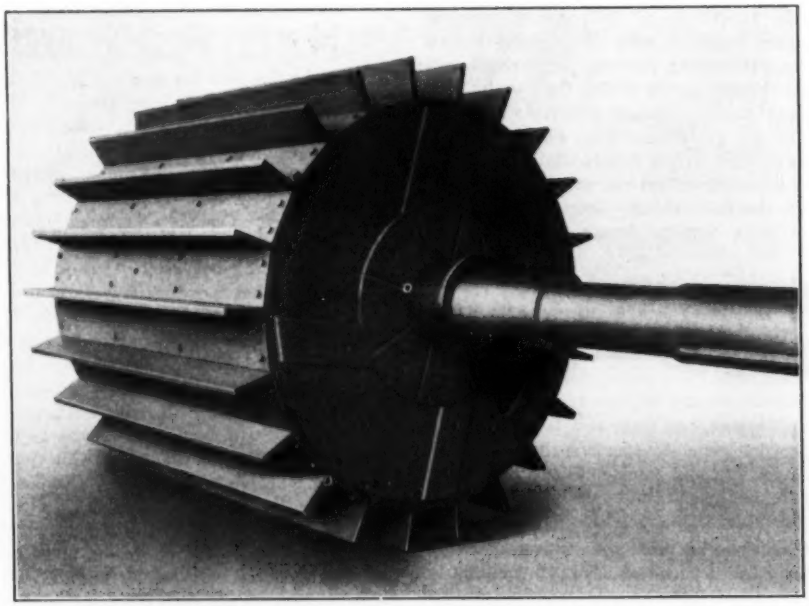
More than 500 employees of paper mills and other industries have enrolled for the second annual safety school at Neenah and Menasha, Wis. The school will be held one evening a week until the holidays at the latter city. John McAndrew, of the Menasha Wooden Ware Corporation, will be chairman of the first program.

Operations at the Nicolet Paper Company, DePere, Wis., were suspended for more than twenty-four hours last week because of exceedingly high water following one of the most severe storms in years. The generators were put out of commission and some water seeped into the basement. The height of the river set a record for all time, since it was four feet above normal.

The United States Forest Service has obtained options on 24,800 additional acres of land in Northern Wisconsin to be added to the federal timber reserves. Most of the land is in the area where federal forests have been designated.

John Kunferman, employed by the Dells Pulp and Paper Company, Eau Claire, Wis., was instantly killed in an auto accident last week.

Breaker Beaters and Rolls.



"More than 800 Dilts Bandless Rolls are in use today in Breaker Beaters and in regular work.

The Breaker Roll shown in the above picture is all steel, hammered steel spindle, cast steel heads, extra heavy steel fly bars and the wood filling is protected by metal covering. It is the Dilts Bandless Type (without bands or rings to hold the bars) with the bars keyed into each of the 4 steel heads. No loose fits, no shims, each key driven home and each fit independent of all other fits, strong, simple, practical and apparently indestructible.

We solicit your inquiries and orders for Breaker Beaters, Bandless Rolls and Dilts NEW TYPE better circulating Beating Engines."

DILTS MACHINE WORKS, INC.
FULTON, N. Y.

"Your Paper is made in your Beaters"

Ontario Fine Paper Mills Continue Active

Writings, Bonds and Ledgers In Excellent Demand With Practically All Manufacturers Operating Near Full Capacity—While Book Paper Mills Have Been Kept Busy On Several Months Advance Orders, Prevailing Demand Has Fallen Off to Some Extent

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., October 28, 1929.—According to the testimony of wholesale paper dealers in the Toronto district the month of October yielded a fair amount of business, although the experience of most of them was that it required greater effort to get than usual. Furthermore, small lot buying is still in vogue by printers and other consumers and stocking up by any concern is practically unknown in the experience of the paper distributing trade. Notwithstanding this, however, sales for October bulked up well in fine paper lines, particularly, and the coarse paper section of the trade experienced some revival during the month. The season for catalog and direct mail campaigns is now on and they are helping consumption of fine paper materially, while there is a good demand for all lines of light weight papers. Mills manufacturing tissues, toilets and paper specialties are quite busy and the distributors, together with the mills having direct accounts with consumers disposed of a large tonnage during the month just closed.

In the mill end of the paper industry there has been a falling off to some extent in demand for book papers. Mills as a rule have been operating on several months advance orders for book but it is noticeable that this favorable condition has been eliminated for the time being and book mills are scouting for orders. They still have considerable margin to play on, however, with orders booked for some weeks in advance, and there is a fair amount of current business passing so that generally speaking the book mills are fairly active. Demand for writings, bonds and ledgers is good, with practically all of the fine paper mills operating close to capacity.

In the coarse paper section there has been some improvement of late, particularly in the paper bag department where competition is slightly less keen under a general disposition by members of the trade to get together in their own interests. There has been considerable price cutting in the paper bag trade and outside competition, also, has militated against the paper bag industry in Canada. There appears to be some prospect of proper organization of the industry which would be welcomed by both manufacturers and distributors. Kraft mills are all busy and the demand is not only being well maintained but is being extended.

George R. Gray on News Print Situation

"The news print situation in Canada is steadily improving," said George R. Gray, of Sault Ste. Marie, Ont., vice-president of the Abitibi Power and Paper Company, who a few days ago paid a visit of inspection to the Fort William plant at the Mission. Mr. Gray expressed the greatest satisfaction with the manner in which the Fort William plant was being operated. While in the city he was the guest of D. G. Calvert, manager of the local plant, and other officers of the company. "As far as production in the Canadian mills and markets for Canadian paper is concerned, the outlook is the highest for some time, and markedly better than a year ago," said Mr. Gray, who aded that he expected the records for this month in the various units of the company would surpass those for September and that any new machines which may be installed next year throughout Canada would be more than offset by the growth in demand for Canadian news print.

Fort William Paper Maker Moves

To take over a position as superintendent of the Anglo-Canadian Pulp and Paper Mill at Quebec City, Que., D. R. Piper, Fort William, left a few days ago for Quebec. Mr. Piper has been associated with the Fort William plant of Abitibi since the opening some years ago. During the shut down he obtained employment with the Quebec mill, but went back to Fort William when the plant there reopened last Spring. He was assistant superintendent of the Fort William mill.

Notes and Jottings of the Trade

The Fred W. Halls Paper Company, Ltd., has sent out some very attractive broadsides setting forth the advantages of blue-white Tanton Book. The latest piece is entitled "Brilliancy in the Printed Page" and it is suitably illustrated with half tone cuts showing the fine printing qualities of the sheet.

A large number of the members of the Toronto Carton Council are taking part in the weekly bowling series of games inaugurated by the paper box makers of the city. O. Cosburn has been appointed secretary of the league in succession to the late A. G. Allen.

J. J. Small, of Guelph, Ont., president of the Canadian Paper Box Manufacturers Association, has returned from a successful business trip through Western Canada and reports optimistic conditions throughout the various western provinces.

The many Toronto friends of Frank Thorne, of Price Bros., Quebec, were pleased to learn that he was sufficiently improved in health to leave the hospital a few days ago. Mr. Thorne underwent an operation for appendicitis a couple of weeks ago.

Commercial Press, Ltd., with headquarters at Windsor, Ont., and with power to carry on business as printers, publishers and paper dealers, has been granted an Ontario charter. Henry Chambers, a well known printer of Windsor, is one of the provisional directors.

G. W. Turk, who is standardizing the woods department accounting system of the Abitibi Power and Paper Company, was in Toronto a few days ago conferring with H. G. Schanche, general woods manager. Mr. Schanche and his family recently took up residence in Toronto.

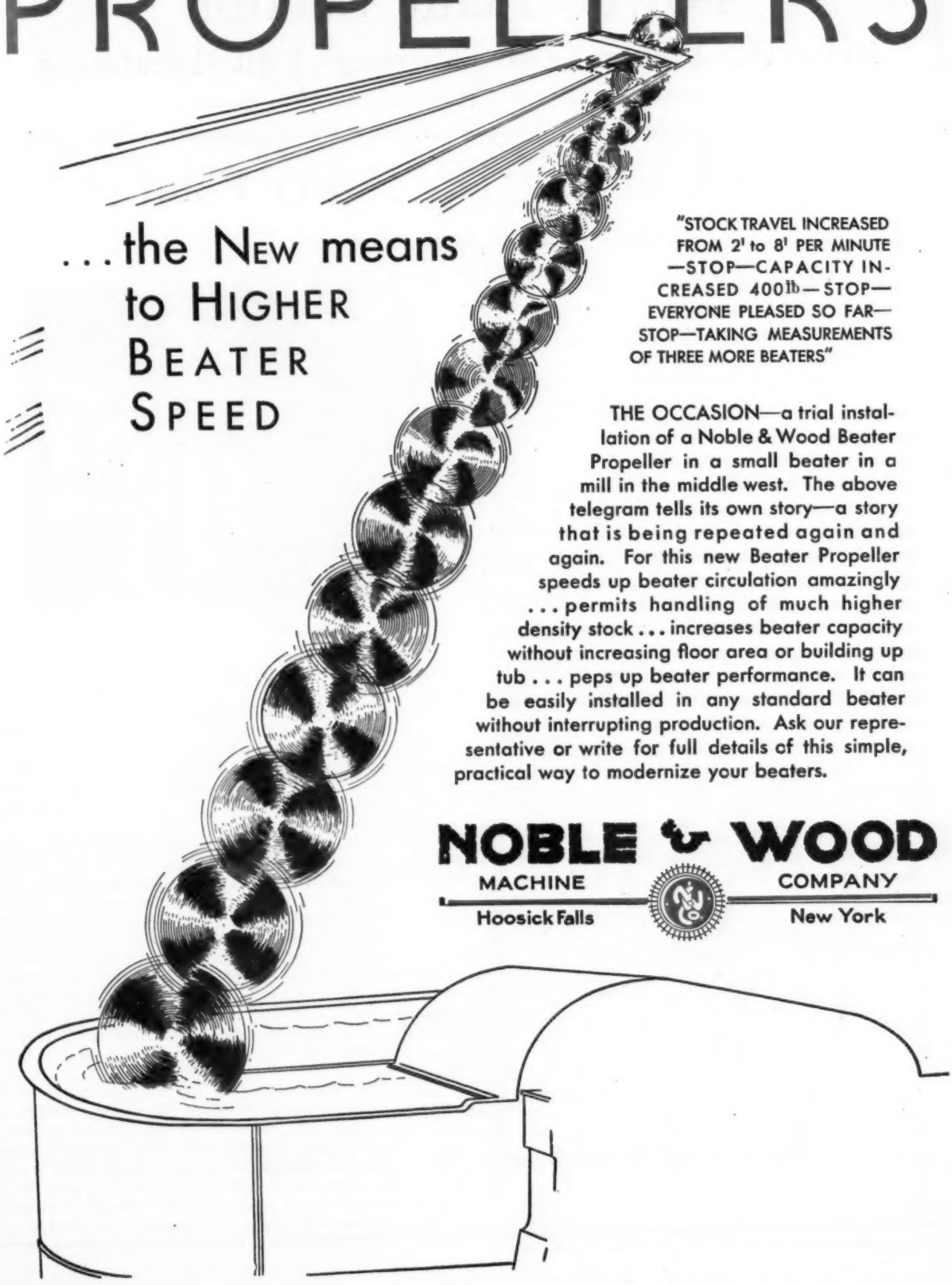
Much has been written and speculated about what the Howard Smith Paper Mills plans to do with recently acquired Canada Paper Company, but nothing has been authoritative except that the plant will be gradually worked up to its capacity, especially in kraft production. The kraft product is mostly shipped to Kilgour Bros., Toronto, a Smith unit. The mills also produce special lines of book paper, colored papers, and ground wood and sulphite pulp, and their capacity will be taxed as the market improves in those lines.

The Department of Trade and Commerce at Ottawa has advised the Canadian paper trade to consider Hong Kong and South China as a potential market for Canadian-made papers. Imports into that quarter now are mainly from European countries. There appears to be a considerable demand in China for all grades of paper and Canadian producers of sulphite, wrappings, kraft, bond and writing papers are being urged to get in touch with the Department for further particulars.

The birds of Canada, which were so beautifully lithographed on the calendar issued by the Howard Smith Paper Mills last year, are the namesakes of a series of bristol boards being made by the Smith mills. Characteristic sketches of the birds appear on the covers of the sample folders of Wren, Goldfinch, and Oriole bristols. The last named is made in white, dark blue, pink, salmon, green, cherry, fawn, canary, light blue, primrose and lilac; the others are in white only.

The Dominion Paperboard Company's plant on the Toronto water front was close down for a couple of days this week owing to damage done by the storm to the water in-take at the plant.

PROPELLERS



. . . the NEW means to HIGHER BEATER SPEED

"STOCK TRAVEL INCREASED FROM 2' to 8' PER MINUTE —STOP—CAPACITY INCREASED 400lb—STOP—EVERYONE PLEASED SO FAR—STOP—TAKING MEASUREMENTS OF THREE MORE BEATERS"

THE OCCASION—a trial installation of a Noble & Wood Beater Propeller in a small beater in a mill in the middle west. The above telegram tells its own story—a story that is being repeated again and again. For this new Beater Propeller speeds up beater circulation amazingly . . . permits handling of much higher density stock . . . increases beater capacity without increasing floor area or building up tub . . . peps up beater performance. It can be easily installed in any standard beater without interrupting production. Ask our representative or write for full details of this simple, practical way to modernize your beaters.

NOBLE & WOOD

MACHINE COMPANY

Hoosick Falls New York

Power Plant Section

Reducing Power Costs Through Unit Treatment

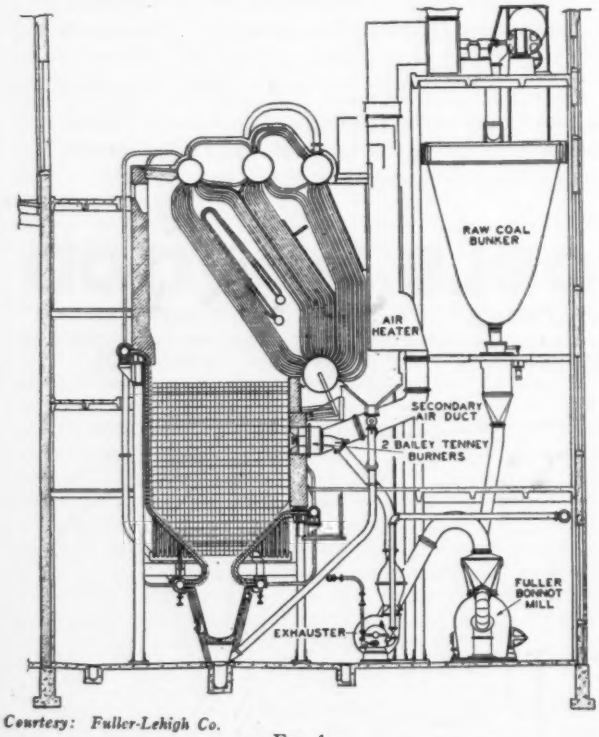
Conducted by REGINALD TRAUTSCHOLD, Consulting Engineer

Modernizing The Power Plant

Pulverized Coal Firing Applications

The developments in efficient systems of pulverized coal firing have, unquestionably, revolutionized practices in steam generation. Where rates of evaporation of anywhere from 3.5 to 7 pounds per hour per square foot of heating surface were quite customary only a few years ago, rates of 20 to 30 pounds are now demanded and realized under the exacting conditions for reliability and economy of steam supply so pronounced in profitable pulp and paper making activities. Considerably less boiler surface, fewer boilers and more compact batteries have to suffice for a given steam demand, a boiler of a given heating surface area being depended upon to generate far more steam than was formerly considered feasible. This means substantially decreased investment costs per pound of steam production.

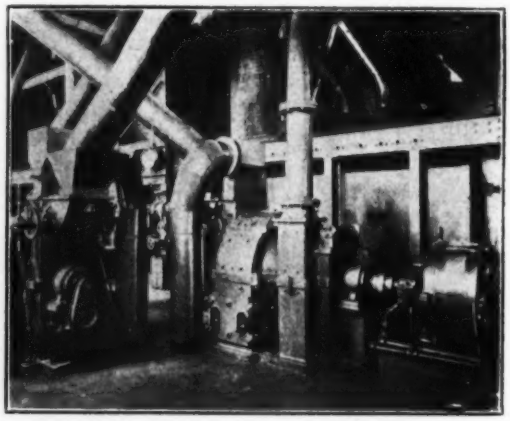
True, the trend toward a decrease in first, or investment, costs is general, whether pulverized coal, modern stoker firing or other combustion system is resorted to, but it has been largely through experience gained in the successful development of pulverized coal systems of combustion that the fact has finally been recognized



Courtesy: Fuller-Lehigh Co.

FIG. 1

Arrangement of pulverized coal fired boiler at the Jno. H. Heald Co.



Courtesy: Combustion Engineering Corp.

FIG. 2

Pulverizer serving 1,000 h.p. boiler at the Tonawanda Paper Co.

that a given boiler's steaming capacity depends upon the amount of flue gases that can be passed, provided, of course, that suitable provisions are made to insure the required dryness of steam and that effective heat reclamation devices hold the temperature of the exit gases within reasonable bounds. Considerably larger combustion chambers are required for the efficient combustion of more coal and greater "turbulence".

These pre-requisites, furnace volume and "turbulence", were more easily obtained with pulverized coal firing than with the stoker methods as practiced until recently, the limitations of grate area, *i. e.*, length and width of boiler, not controlling the fuel burning capacity of the powdered coal furnace. Increased combustion space was readily secured through the single expedient of setting the boiler higher and almost any degree of "turbulence" desired secured through proper multiple flame placement. Furnace walls were water cooled and preheated combustion air supplied. The investment in boilers, consequently, was lower and the money so saved was wisely utilized for installing efficiency increasing auxiliaries yielding handsome returns on such marginal investments.

Many of the refinements which have been instrumental in the development of successful pulverized coal burning systems, as they proved their worth, have also been incorporated in modern stoker firing systems, in which substantially increased furnace volume and greater "turbulence" have been well secured in other ways. The result is that while the great stimulus given to advanced steam generating practices by the successful development of pulverized coal firing has resulted in innovations which greatly curtail furnace maintenance and virtually eliminate any serious

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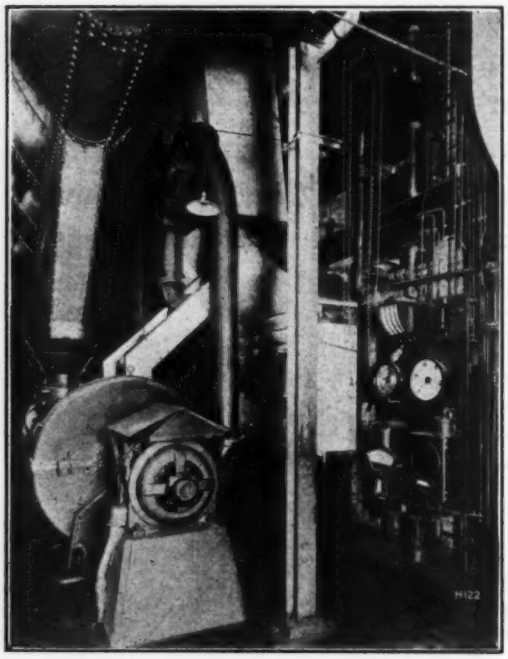
limitation to high combustion rates and high capacities, the advance is quite general in all approved systems of fuel combustion for steam generation.

Distinctive Advantages of Pulverized Coal Firing

However, pulverized coal fired boiler plants, of which there are more serving the paper making industry than any other industrial field outside that of the electric public utilities, are unique in their ability to burn various grades of bituminous coals, not simply cheap low grades, and in the ease with which they can be adapted to gas or oil firing when the fuel market warrants such shift. Banking losses are negligible and the reliability of approved systems of pulverized coal firing is of such high order that boiler outages traceable to the failure of the fuel burning equipment are now quite rare. This latter advantage, the importance of which in paper mill service even outranks that of high boiler efficiency, has been found to apply to the unit system of firing as well as to the storage system of burning pulverized coal. For certain load conditions, however, and plant sizes, the latter system is considered the more suitable, for in reliability and flexibility it is probably unexcelled.

In considering the more obvious advantages of pulverized coal firing, it might be well to refer briefly to a report made by one of the more prominent of the eastern pulp and paper concerns in respect to just this question and then to cite the views held by some other leaders of the dual industries. Incidentally, the eastern mills in question operate a large number of stoker fired boilers in their various plants and turned to pulverized coal firing only after making comprehensive, and to them conclusive, tests extending over a number of years.



Courtesy: Riley Stoker Corp.

FIG. 3

Pulverizer and control board at the Fitchburg Paper Co.

These investigations began as far back as 1923, when a pulverizer was installed and the advisability of adopting pulverized coal firing studied from the results obtained under the exacting conditions of mill operation. The success of these early experiments may be judged by the fact that since they were commenced nearly seven years ago, seven additional pulverized coal burning units have been installed at the same plant. In 1926, a 400-pound station fired on pulverized coal was erected and two years later two more units were added. In the same year, eight more boilers were equipped for powdered coal firing.

At the present time, a 600-pound station, similarly fired, is under construction, to be equipped with five pulverizers and automatic combustion control, and other developments along the same line are under consideration. Commenting upon the experience with powdered coal, a member of the engineering department states: "Our company is definitely committed to powdered coal and the unit system of firing. We have pulverizers of both the impact and ball mill type; each type having its own advantages. The company has installed no new stokers in recent years. While equal efficiencies may be obtained with powdered coal and modern stokers, we feel that the powdered coal possesses more advantages on account of the adaptability of the system to a wide variety of coals, varying in ash, moisture and volatile content, responsiveness to changes in load, and commercial economy."

Courtesy: Riley Stoker Corp.

FIG. 4

Pulverized coal firing adds capacity at Piedmont for the West Virginia Pulp & Paper Co.

Stress is laid on rational furnace design and proper flame placement, the position being taken that a properly designed furnace is of greater importance than burner design or fineness of pulverization. The chief disadvantage is said to be the fly-ash problem.

John F. Rhoades, Chief Engineer, The Mead Pulp and Paper Company and prominent in all technical affairs concerning the dual industries, states: "The paper making industry is gradually taking advantage of powdered coal applications, finding that this method of burning coal gives a large return on the investment. In addition, it affords continuity of operation which has not been apparent in the older installations. The gain in efficiency as well as the elimination of the black smoke and cinders has made the plants so much cleaner. Either the bin (storage) or the unit system is recommended, as they are about equal in application. The service records of plants in operation show that the troubles due to shut-downs have been largely reduced."

He also claims that with pulverized coal firing it is possible

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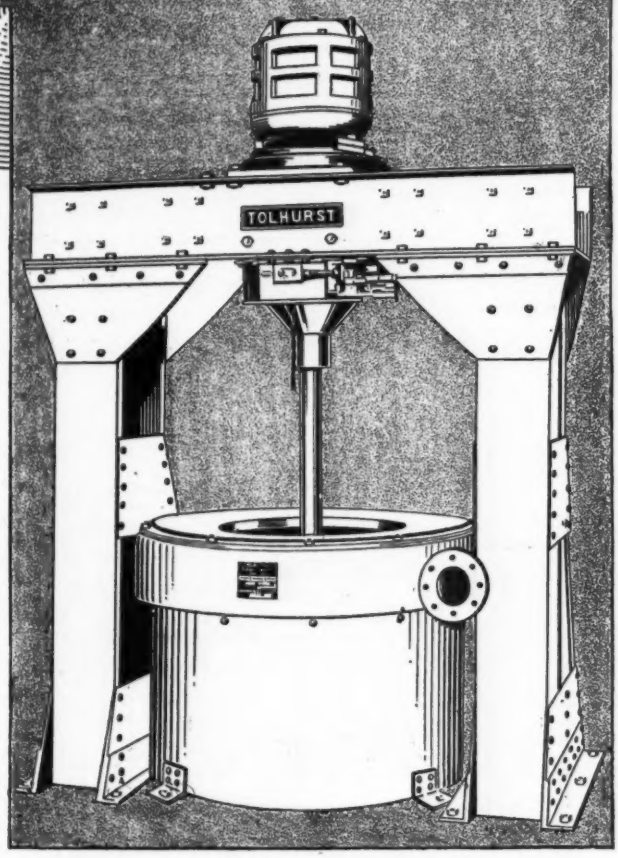

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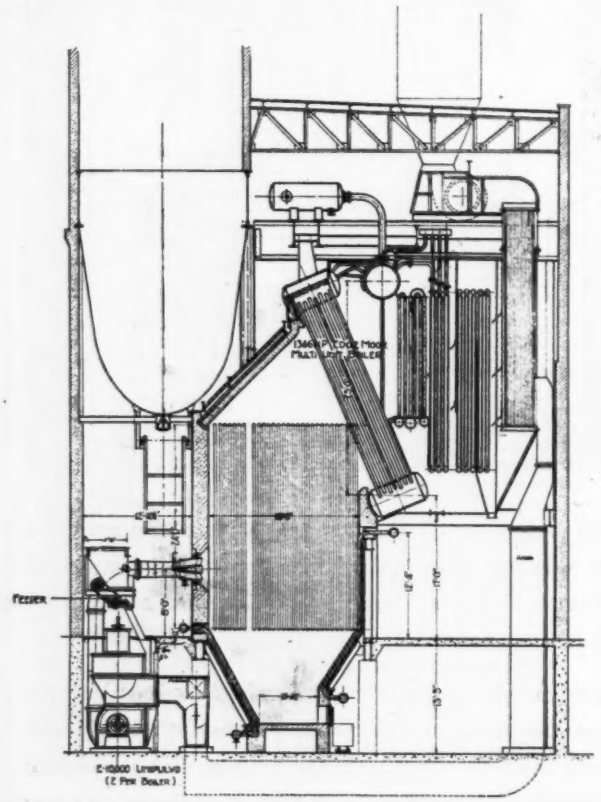
Reliability and Low Cost Maintenance

Expressing his views on the subject, M. J. Argy, Superintendent, Cliff Paper Company, advises that a pulverizer installed for a 500-horsepower boiler in 1923 has burned all kinds and all grades of coal with very economical results during the past five or six years and that the installation has been eminently satisfactory in every way. In fact, he states that since the system was placed in operation not a single hour has been lost through any fault of the pulverizer and that the consumption of fuel has been greatly reduced.

At the Tennessee Paper Mills, A. M. Sheperd, Vice President and General Manager, enthusiastically endorses pulverized coal firing, basing his opinion upon an operating period of nearly five years. He states that during such time no difficulties whatever have been encountered and feels that many advantages have been apparent. In fact, such satisfaction is felt with pulverized coal burning that contemplated plans for an enlarged boiler room include the firing of additional boiler equipment with a system of pulverized coal combustion.



Courtesy: Strong-Scott Mfg. Co.

FIG. 5

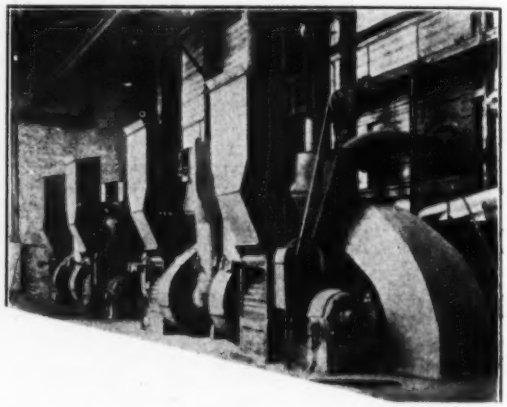
High pressure boiler layout for the Waldorf Paper Products Co.

The question of maintenance in connection with the various wearing parts of pulverizing equipment, always of interest and considerable concern, would appear to impose no great burden, at least judging from the experiences of certain paper mills. For instance, the Pejepscot Paper Company operates two varieties of pulverizing mills of the impact type and report that the average life of the wearing parts for one variety are as follows:

Swing hammers	3,370 tons
Liners and fans	13,500 tons
Plates	6,740 tons

For the other variety of impact type, pulverizing mill, the maintenance records show the average lives of the renewable parts to be:

Rolls and rings	18,000 tons
Feed screws	9,000 tons
Exhauster blades	14,500 tons



Courtesy: Strong-Scott Mfg. Co.

FIG. 6

Unit coal pulverizers serve the four 1,000 h.p. boilers at the plant of the Great Lakes Paper Co., Ltd.

These records are based upon extended experience with four pulverizers of the one variety and a large mill on the other.

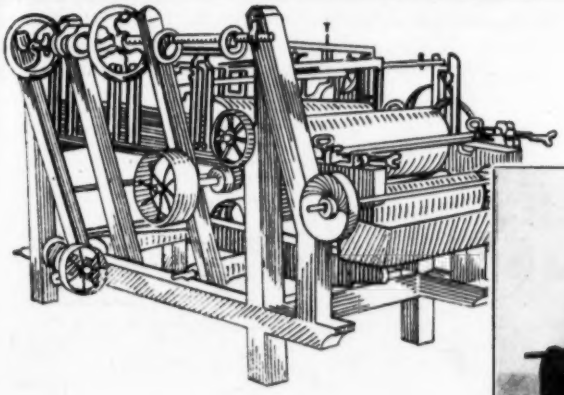
The experience of the Lockport Paper Company, where a powdered coal system was installed October 15, 1924, is also of interest, particular note having been taken of all upkeep expenses. In regards to the cost of maintenance on paddles, blades, liners and other wearing parts, the item averages about 4.5 cents per ton of coal pulverized and it is found that between 1,600 and 2,000 tons can be suitably pulverized with a single set of blades and paddles, while the liners and screen plates stand up for six months before requiring replacement. Screen tests to ascertain the fineness of pulverization before and after changing paddles and blades show that after 1,800 or 2,000 tons have been powdered, the fineness of pulverization is such that about 74 per cent of the coal passes through a 200 mesh screen, while with new paddles and blades, 84 per cent will pass through such a screen.

E. B. Highhouse, Plant Engineer, states that the mill is very quiet and smooth in operation, very light on oil, and that the operation of the unit is extremely simple and economical. A yearly average efficiency of 78 per cent is maintained without difficulty, which means a saving of about 5,000 tons of coal a year, as compared with previous results with stoker firing, and $6,200.00 per annum in labor, plus the cartage and handling expenses of refuse on the old installation.

Specific Applications of Note

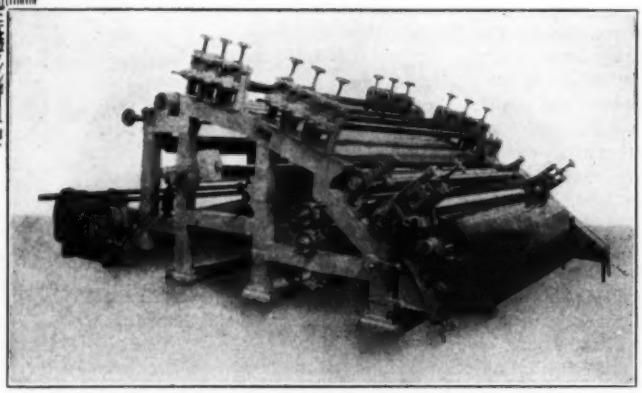
One of the latest paper mill power plants to go into operation with high-pressure boilers, pulveried coal equipment and with bleeder and back pressure turbines is that of the John H. Heald Paper Company at Lynchburg, Va., concerning which a few statistics will doubtless be of interest. While sufficient time has not yet elapsed for the compilation of much operating data, the arrangement of equipment is very compact and is quite distinctive in the conveniences provided for operation and control.

From overhead storage bins, the coal drops through automatic scales to three 5-ton unit pulverizers on the ground floor, each located in front of and serving a single water tube boiler with



Sketch above shows the old Wood Frame Flat Coater—the earliest method long since discarded.

Photo below shows the new Waldron Arched Bed Coater—a marvel of efficiency and economy in the coating of paper.



Coating Methods and Machines Had to Advance

Modern coating must be up to the high standard of quality that an intelligent market now expects. And because improved quality brings about increased demand, speed in production becomes almost of equal importance. But the achievement of both these objectives is of no avail unless such production can be justified by the cost of securing it.

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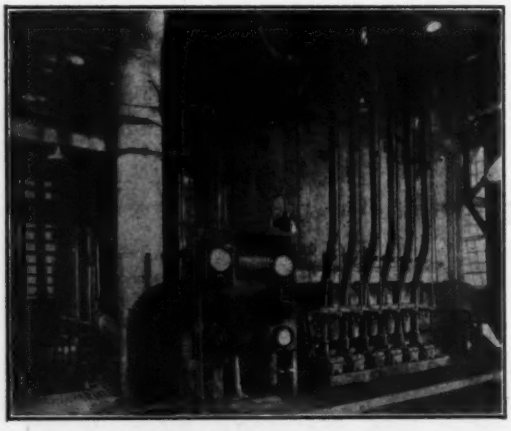
four gas passes. After being pulverized, the coal passes into the exhauster blower, from which the mixture of powdered coal and hot primary air is forced through a "Y" duct leading to the two burners on each boiler. There is no means of connecting a pulverizer and exhauster to any other boiler than the one the combination serves, breakdowns not being anticipated, but to insure against any boiler outage in the very rare possibility of trouble two of the three boilers are provided with mechanical-atomizer oil burners placed below the pulverized coal burners. These supplementary burners operate on natural draft and are hinged so they may be swung out of the way when not in use. This unusual arrangement was found to be cheaper to install than a cross connection of pulverizers, for it avoided the expense of any cross connection of air ducts from the air heaters.

The boilers are designed for 325-pound pressure and superheaters are employed. The pressure was selected as giving the best heat balance with a turbine bleeder pressure of 30-pound gauge. To prevent slag formation on the lower portions of the furnace walls, smooth bare metal blocks are placed on the lower part of the side walls and on the uptake and downtake hopper floor, rough metal blocks covering the upper portions of the side walls and the vertical section of the uptake wall.

The slag which forms drops into an ash hopper, where it is quenched and broken up by water sprays and then floated out to an outside pit. The fly-ash from the gas passages in the air heater is dropped through a cast iron duct into the water trough under the boilers.

In the design of the plant, the estimated boiler performance, computed on the use of coal running 2.1 per cent moisture, 29.12 per cent volatile, 74.0 per cent fixed carbon, 4.78 per cent ash, 0.76 per cent sulphur, and with a heat content of 14,900 B.t.u., was as follows:

Steam flow per hour, lbs.	70,000	90,000
Steam pressure, lbs. gage	325	325
Superheat, degrees F.	100	104
CO_2, per cent	15	15
Gas temperature leaving boiler, degrees F.	615	690
Gas temperature leaving air heater, degrees F.	347	394
Air temperature to heater, degrees F.	80	80
Air temperature from heater, degrees F.	435	472
Feed water temperature, degrees F.	200	200
Draft loss in boiler, inches	0.8	1.5
Draft loss in air heater, inches	0.88	1.5
Air resistance through heater, inches	0.60	1.0
Gas per hour, pounds	90,600	118,500
Air per hour, pounds	71,900	94,100
Efficiency, including boiler, furnace heater and superheater, per cent	79.5	77.5

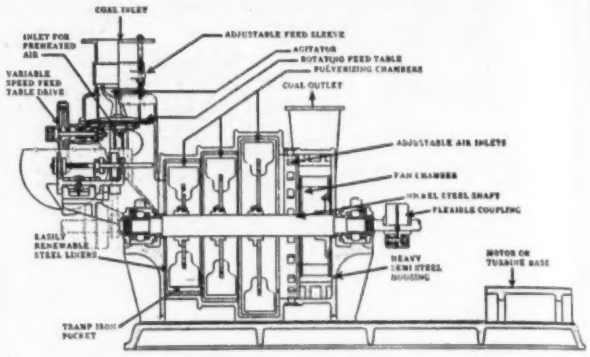


Courtesy: Combustion Engineering Corp.

FIG. 7

Large powdered coal fired boiler and centrally located control board at Canadian International Paper Co.

The power plant at the Towanda Paper Company is also an efficient and interesting one. Steam is supplied by two 1,000-horsepower water tube boilers fired on pulverized coal. Mine-run coal from Pennsylvania and West Virginia, averaging about 12 per cent total moisture, is pulverized, 85 per cent passing a 200 mesh screen, and two mills serve each of the boilers, although under ordinary conditions three mills suffice to carry the total plant load. Each furnace has four burners and to assure good flame distribution when one mill only is operating, the discharge pipes to the burner branch to alternate burners.



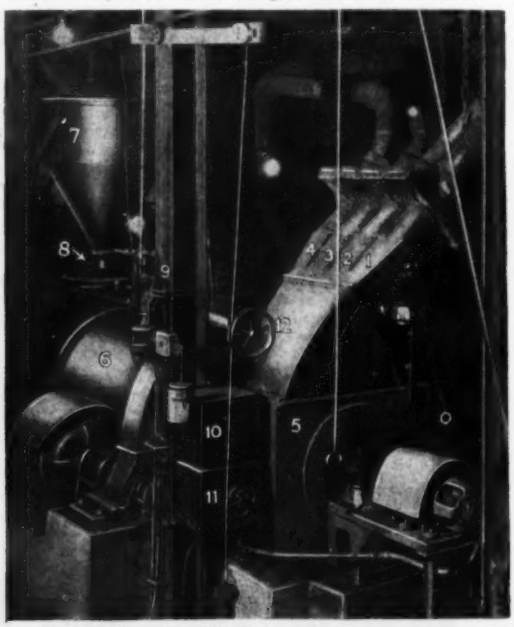
Courtesy: Erie City Iron Works.

FIG. 8

Type of unit pulverizer installed at the Flintkote Co. plant at Lockport, N. Y.

Preheated air is drawn from undre the furnace floor and is used in drying the coal during pulverization, while secondary air for combustion is admitted through control ports in the furnace walls. From all accounts, the operation of this plant has proved eminently satisfactory and the installation is considered a very good example of pulverized coal firing in exacting paper mill service.

At the pulverized coal boiler plant of the Fitchburg Paper Company, which was discussed in some detail in these columns February 28, 1929, two pulverizers are installed in connection with the large 1,013-horsepower boiler, though the load is carried by only one such unit, the second one being held as a spare. A slag screen is located in front of the bridge wall, radiant heaters are installed in the side walls and preheated air is used. The entire installation is hooked up with complete automatic control and the plant is



Courtesy: Kennedy-Van Saun Mfg. & Eng. Corp.

FIG. 9

Compact arrangement of pulverized coal equipment and control system at the Racquette River Paper Co.

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operated by one man, whose duties are reported to be exceedingly light. In fact, all the man has to do is to watch the instrument board to be sure that everything is functioning properly.

An interesting application of pulverized coal burning equipment to two 846-horsepower boilers is being made at the Tyrone, Pa., plant of the West Virginia Pulp and Paper Company. These boilers are to be operated at 420 per cent of rating, generating approximately 100,000 pounds of steam per hour, and are expected to develop an efficiency of at least 85 per cent.

At the Piedmont, W. Va., plant of the same company, pulverized coal burning equipment has been installed for two 900-horsepower and for six 595-horsepower boilers, in order to secure more capacity from these batteries and to boost their efficiency. The units are designed for operation up to 250 per cent of boiler rating.

A highly efficient application of pulverized coal burning equipment has the distinction of driving the boilers which supply the steam for the largest paper machine as yet in operation, designed for an operating speed of 1,500 feet per minute. This is at the Great Lakes Paper Company, Ltd., Fort William, Ont., where four 1,000-horsepower boilers, each with 900 square feet of superheater surface and 14,400 square feet air preheater, are designed for operation at a maximum rating of 380 per cent. The side and rear walls of the furnace are water cooled, the front wall air cooled and the furnace volume a matter of 9,700 cubic feet.

Much in line with these present day pulverized coal furnace specifications, but even more striking, are the figures pertaining to the high pressure plant at the Waldorf Products Company, where steam at 650 pounds pressure and carrying 250 degrees of superheat is generated by two 1,346-horsepower water tube boilers at a maximum boiler rating of 400 per cent. Immense superheaters are entailed and the tubular air heaters present 15,200 square feet of heating surface. The water walls cover an area of 12,000 square feet and the furnace volume contains 11,700 cubic feet.

Steam at Less Than 30 Cents Per Thousand Pounds

An installation of pulverized coal fired boilers which has made an enviable record is at the Racquette River Paper Company, Potsdam, N. Y., where it is reported that a steam cost of less than 30 cents per thousand pounds is realized. The close-up view of the pulverizer assemblage shows the marked compactness of the arrangement, the various units being numbered to facilitate tracing the path of the coal from the supply bunker to the distributing ducts. In brief, the passage and sequence of operations are as follows:

Bunker 7 supplies the coal to the disc feeder 8, which in turn controls and regulates the supply of fuel entering the pulverizer, 6. The pulverized output of the mill is then floated by and through the air fan 5 to the distributing ducts 1, 2, 3, and 4 which feed the four 258-horsepower boilers which constitute the steam generating battery. Sensitive control is provided through the master automatic regulator 9 which operates the fan controls 10 and 11 and also the control wheel 12 which operates the disc feeder. The secondary air control is located at the rear of fan 5.

A Typical Plant

A pulverized coal plant which well exemplifies ability to burn successfully a wide range of coals is that at the plant of the Canadian International Paper Company at Three Rivers, Quebec. In designing the furnaces, provisions had to be made for the burning of Nova Scotia coal having a low fusing point ash, high grade Pennsylvania and West Virginia coals, together with other American and Canadian coals varying widely in composition and heating value, all at average boiler ratings or 200 to 250 per cent. with maximum rating of 300 per cent. The fuel preparation plant is in this installation a separate assemblage, space not being available at the boiler plant for its accommodation, located between the coal storage and the river wharf and alongside a railroad siding.

Coal from the raw fuel bunkers passes through individual 6-ton steam-grid, gravity type, driers, into 6-ton mills, of which there are five. The pulverized coal is then handled by transport pumps and carried by pipe to the overhead powdered coal bunkers in the boiler plant, some 600 feet distant. This boiler plant is designed for eight 1,016-horsepower boilers with pulverized fuel burning furnaces and individual air preheaters. At the bottom of each overhead supply bunker, three duplex, motor driven, feeders are provided for supplying six vertical, forced draft burners located in the horizontal flat arch in front of each boiler.

To care for the Nova Scotia slack coal fired at times, a horizontal water screen and deep ash pit are provided, the screen being so located that the distance between the top of the screen and the under side of the arch at burner level is sufficient to insure that at all times the flame will be kept above the water screen, to prevent slagging the ash in the furnace hoppers. Partial side wall fin-tube water screens and back wall fin screens are also provided to reduce furnace maintenance and furnace temperature at the higher ratings. Air cooled front walls and part of each side wall are of refractory material to insure fuel ignition and complete combustion.

The first year this well planned plant was in operation, not only was it demonstrated that Pennsylvania and Nova Scotia slack coals can be prepared and burned economically in such a plant, but furnace and boiler operation showed high efficiency with complete combustion, a minimum of slag trouble and practically no maintenance expense. A comparison of steam production fuel costs with those of a previous oil fired plant serving the first section of the mill constructed showed a saving of 40 per cent

Many More Typical Examples

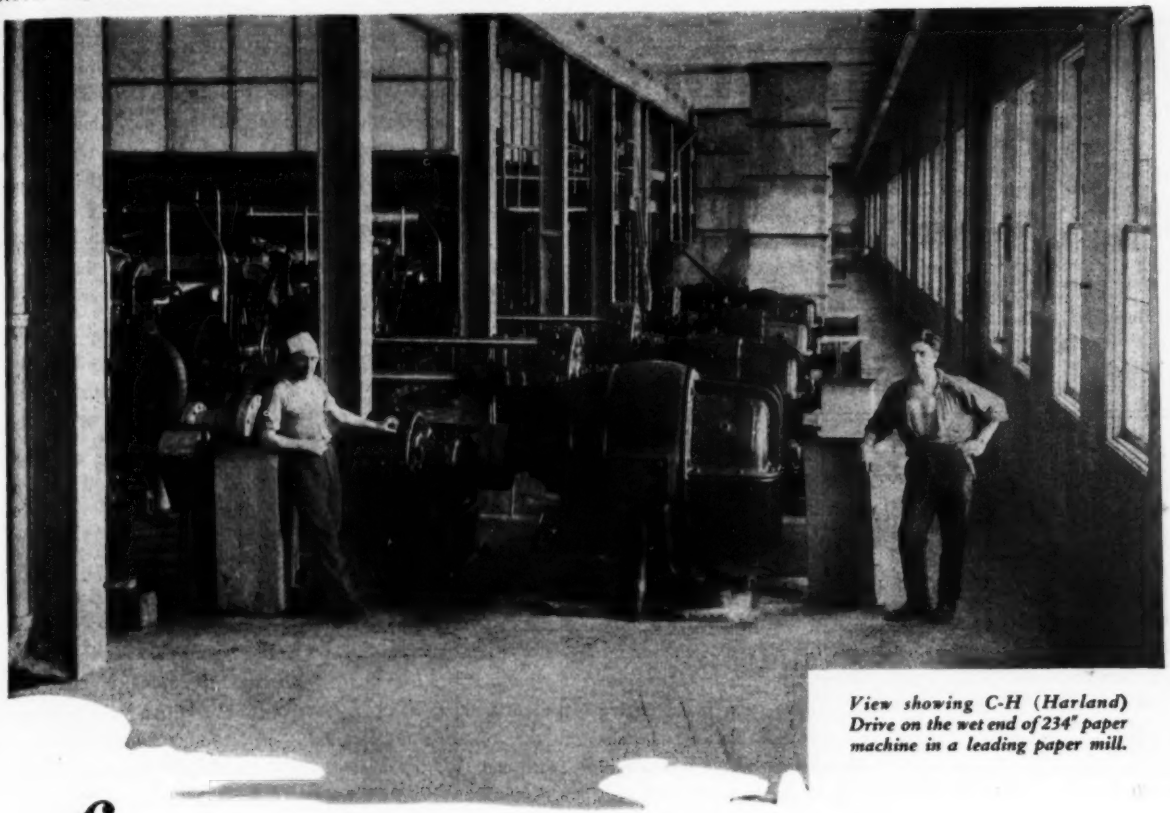
Many more examples typifying successful and economical installations of noteworthy powdered coal plants, such, for instance, as that at the Lockport, N. Y., plant of The Flintkote Company which in comparison with the combustion system it replaced shows an efficiency 12 per cent. higher, a labor and maintenance charge 63 per cent. lower and burns a cheaper grade of fuel with an annual saving of over 1,150 tons in coal consumption, could be mentioned, but the instances already cited should serve to indicate at least the great progress made in combustion practices in recent years. Progress, attributable, no doubt, largely to the high efficiency and marked reliability of approved systems of pulverized coal firing and to advanced boiler design and construction. Unquestionably, the method of burning coal in powdered form has much to commend it.

New Unit Ready for Production at Riverbend

MONTREAL, Que., October 28, 1929.—According to an official of the company, the fourth 100-ton unit at the Riverbend mill of Price Brothers & Co. will go into production this coming Friday, November 1. This will bring the total Riverbend production up to 400 tons of news print per day. This is the second machine to be installed this year. Both embody several new features, which in the case of the first one brought up new difficulties in regard to adjustment. These difficulties have been overcome and the machine is now running smoothly at full capacity.

During the past week the mill has been visited by the Rt. Hon. J. Ramsay Macdonald, Premier of Great Britain, whose guide, in a visit to the region of the Upper Saguenay, was Colonel Price, the head of Price Bros. & Co.

The fact that the Donnacona Company's sulphite mill last week doubled its run and is now producing 100 tons of sulphite daily is linked with the development at Riverbend, and the increased demands for pulp by the parent company. Good progress is being made with Donnacona's plant now under construction at Quebec for the manufacture of wall board. Most of the product, it is stated, will be exported, the company being placed in a strategic position as regards freight rates owing to its location on tide water.



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EXPANSION AND IMPROVEMENTS

The Mill and Mill Equipment Number of the PAPER TRADE JOURNAL is printed annually at this time of the year to visualize the expansion of the pulp and paper industry in the way of new plants as well as the improvement that have been made during the year to going mills. It would be too formidable an undertaking to attempt to include a complete description of every new mill that has been built or to cover all the important improvements that have been made during the year, but in this issue it is felt that at least many of the high lights in the activities of the past year have been touched.

Certainly an impressive picture of what is occurring in the pulp and paper industry on the North American continent has been presented. Many millions of dollars have again been expended in the erection of the most up to date and efficient pulp and paper mills, as well as in the expansion and refinements of the mills already in existence.

Among the most interesting features of the Mill Number this year is undoubtedly the article by Mr. Ronald G. Macdonald, secretary of the Technical Association of the Pulp and Paper Industry and editor of the Technical Section in the PAPER TRADE JOURNAL, who has described "Manufacturing Developments in the Pacific Northwest Mills." This article was prepared especially for the Mill Number of the PAPER TRADE JOURNAL after Mr. Macdonald's visit to the Pacific Coast to assist in establishing in that territory a Pacific Coast section of the Technical Association of the Pulp and Paper Industry.

The establishment of this section of the Technical Association of the Pulp and Paper Industry in itself is good evidence of the substantial development of the pulp and paper industry in that particular part of the country. It is more definitely brought out, however, by the editor of the *Tacoma News Tribune*, who at the time of the formation of the new Technical Section said: "The meeting focuses attention on a phase of manufacturing that in the space of a few years has developed into one of the most flourishing businesses on the Pacific Coast. Growth of the industry during the last five years in particular has been phenomenal.

"Washington in particular is interested in this development because a recent survey conducted for the Pacific Northwest advisory board shows that Washington has outstripped Oregon and British Columbia to become the dominating pulp and paper manufacturing center on the Pacific Coast. The report shows that at the close of 1928 there were 22 mills in Washington, eight in British Columbia and seven in Oregon. In 1923, Washington had seven mills, Oregon five and British Columbia four. Virtually all of the Washington mills are located on Puget Sound or in Southwest Washington.

"Some conception of what the industry means to this region is apparent in that at present it gives employment to approximately 8,500 men, most of whom are specialists and highly paid. The payroll of the industry in this state in 1928 was approximately $6,000,000. Nor is the end yet in sight, for additional mills are either contemplated or are already under construction. The industry promises to go a long way toward making good its claim of being Washington's fastest growing manufacturing enterprise."

The new Pacific Coast mills that were started during the year or which will go into operation soon include the Grays Harbor Corporation, Hoquiam, Wash., sulphite bonds; Sitka Spruce Pulp and Paper Company, Empire, Ore., sulphite pulp; and the Umpqua Pulp and Paper Company, Reedsport, Ore., sulphite pulp. Among the outstanding improvements was the addition of a second unit to the mill of the National Paper Products Company at Port Townsend, Wash., where a 251-inch Fourdrinier, said to be the widest machine in the United States, was installed.

Canada has again been active in the building line. Her additions to the industry include three great news print mills as follows: New Brunswick International Paper Company, Dalhousie, New Brunswick; Mersey Paper Company, Ltd., Brooklyn, Nova Scotia, and James MacLaren Company, Masson, Quebec. The improvement of most interest was the starting of the 304-inch Fourdrinier at the plant of the Great Lakes Paper Company, Ltd., Fort William, Ontario, the largest paper making machine in the world.

Notable additions to the new mills were made in the South. These include the new kraft mills of the International Paper Company of Alabama, at Mobile, Ala., Albemarle-Chesapeake Company at West Point, Va., and the new mills making board from chestnut chips, which include the Harriman Company, at Harriman, Tenn. Tennessee Extract Company, at Nashville, Tenn., and the Jno. Heald Company, at Lynchburg, Va.

Several insulating board mills of rather unusual type were started during the year or will start soon. These include the Insulating Board Division of the Chicago Mill and Lumber Corporation at Greenville, Miss., and the Wood Fibre Board Corporation at Lisbon Falls, Me. These are equipped with machines of new type and their operation will be watched with unusual interest.

While the new mills that have been built during the year are the most interesting part of the picture that it has been endeavored to outline, the improvements that have been made are not less important. In order to meet successfully the keen competition that is taking place today, pulp and paper manufacturers must constantly keep abreast of the times in the way of refining their equipment and introducing improvements that are likely not only

to lessen production costs, but also to better the quality of their production.

This Sixth Annual Mill and Mill Equipment Number obviously affords ample evidence that they are not asleep at the switch. There is increasing evidence also that pulp and paper manufacturers are more disposed than ever to be interested in any equipment that will lessen costs or improve their production, or attain both of these much to be desired ends.

Institute of Paper Chemistry Formed

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., October 28, 1929.—In order to meet the problem of training for chemists so they will be fitted especially for the paper industry, there has been created at Lawrence College, Appleton, Wis., an Institute of Paper Chemistry. Not only will undergraduates receive proper preparation for this work, but there will be a graduate school where chemists actually will be trained.

In announcing the Institute, Dr. Henry Merritt Wriston, president of the College, declares that it will have three main functions. The first is to educate along broad lines students who show adaptability and proficiency in pulp and paper chemistry, a field heretofore untouched in this area. It will offer graduate work in paper chemistry to selected students. This would be supplemented by part time work in the industrial laboratories and employment during vacation periods in various mills.

There would also be placed at the disposal of the paper industry and students the facilities of a comprehensive research library and authoritative information service covering subjects relating to the paper industry and to paper chemistry. The third purpose would be to centralize and co-ordinate research in the interest of the whole industry, and, when desired, facilitate research in specific problems of individual concerns.

Because of the immensity of the paper industry in the area where Lawrence College is located, it was the belief of President Wriston that this was the logical place for a much needed service. It was logical also that Lawrence should be chosen, because L. M. Alexander, president of the Nekoosa-Edwards Paper Company, Judson G. Rosebush, president of the Patten Paper Company, Ltd., and an officer of several other mills, are on the board of trustees of the college. The Institute will be financed jointly by the College and the paper mills of Wisconsin, ninety per cent of whom are represented. A board of governors, with the paper industry represented, will control the institute.

Herbert C. Hoover, president of the United States, and Julius Klein, assistant secretary of the United States Department of Commerce, have written letters commending the school very highly. "Through the association of institutions of learning with business the colleges will be in a position more adequately to serve present day needs," declares the president.

Wisconsin Mills Fight Freight Increases

APPLETON, Wis., October 24, 1929.—Paper mills of Wisconsin are joining with the Wisconsin Manufacturers Association and others to oppose increases in freight rates in the Western Trunk Line territory. After hearings before the Interstate Commerce Commission, there have been recommendations for many changes in class rates, with increases predominating. This situation obtains despite the fact that carriers have not requested increases, nor have there been complaints from competing concerns.

Some of the paper manufacturing cities in Wisconsin are regarded as border points between rate-making territories. The shippers are asking that they be treated thus for all territories so that eastern shipments would take the eastern classification, western shipments the western, and so on. This would tend to equalize a situation where competitors even in nearby areas otherwise would have advantages which would be damaging to Wisconsin mills.

E. H. Naylor Leaves Tissue Association

At the October meeting of the Tissue Paper Manufacturing Association, E. H. Naylor presented his resignation as secretary, treasurer and counsel, to take effect on February 1, 1930. This resignation, while not unexpected, was most reluctantly accepted.

The reason for this decision on Mr. Naylor's part is that his work as secretary-treasurer and lawyer for the Writing Paper Manufacturers Association has increased to such a degree over last few years that it is impossible for him to find the time to devote to any other interests.

Last year Mr. Naylor intimated to the officers of the Tissue Association that he might have to give up the work, and a meeting of the executive committee and ex-presidents was held in New York, and he was urged to carry on for another year at least, but conditions have become even more difficult as time has passed which made this decision on his part necessary.

He has been secretary-treasurer of the Tissue Paper Manufacturers Association for fourteen years, and has held the same position with the Writing Paper Manufacturers Association for over sixteen years. This latter association is not only the oldest trade association in the United States, and therefore in the paper industry, but is also the largest and most active trade association in the industry.

Herbert L. Thwaite who was formerly associated with the Frank L. Scott Company, paper distributors in New York City, has been elected as temporary successor to Mr. Naylor, and between now and the first of February is taking over the work under Mr. Naylor's direction. His offices for the time being are in the American Paper and Pulp Association, 18 East 41st street, New York City. The Tissue Paper Manufacturers Association headquarters are at 44 Vernon street, Springfield, Mass.

Put Duty of 5½ Cents on Casein

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 30, 1929.—The coated paper manufacturers of the United States last week lost their fight to keep a reasonable tariff rate on casein when the Senate by a vote of 52 to 19 put a duty of 5½ cents per pound on casein. However, the fight is not yet over. It is quite possible that when the bill goes into conference that this rate may be lowered.

The present duty is 2½ cents per pound under the Tariff Act of 1922. The duty as it passed the House remained at 2½ cents. When the bill was reported to the Senate by the Finance Committee a duty of 3½ cents per pound was recommended.

Farm interests have contended in both the House and the Senate that the duty should be 8 cents per pound and Senator Shortridge of California introduced an amendment for an 8 cent duty.

As a matter of fact the 5½ cent duty voted by the Senate was in the nature of a compromise between the 3½ and 8 cent recommendations. It is understood that the farm leaders are not satisfied even with the 5½ cent duty, feeling that this will be cut when the bill goes to conference.

It was Senator Blaine of Wisconsin who suggested the 5½ cent compromise duty.

In connection with the casein fight a statement was sent to the homes of all of the Senators sponsored by Walter D. Randall, of the Champion Coated Paper Company, Hamilton, Ohio; Martin Cantine, the Martin Cantine Company, Saugerties, N. Y.; and Alex. G. Gilman, of the Allied Paper Mills, Kalamazoo, Mich.

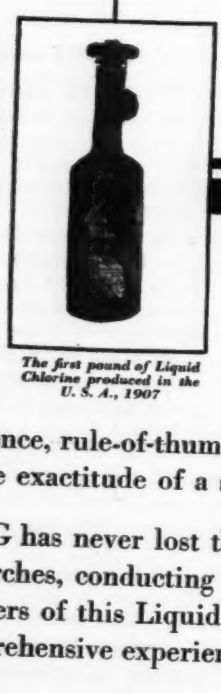
Find Wood Pulp Not Unreasonable

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 30, 1929.—The rate on imported wood pulp, in carloads, from Baltimore and Philadelphia to Albany, N. Y., have not been found unreasonable or unduly prejudicial by the Interstate Commerce Commission in a decision in the case of the Albany Perforated Wrapping Paper Company against the Baltimore & Ohio Railroad Company. The complaint has been dismissed.

Events of 1909

Bleriot makes the first flight across the English Channel, 1909. Here shown rounding the stake at Rheims.



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Those who lead the way are called pioneers.

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E B G pioneered in manufacturing Liquid Chlorine. In consequence, rule-of-thumb bleaching methods were eliminated . . . bleaching was advanced to the exactitude of a science.

E B G has never lost the pioneer spirit . . . nor will it. E B G is continually making researches, conducting experiments, adapting and improving. The point is, users of this Liquid Chlorine profit from the scientific facilities and comprehensive experience which E B G places at the service of industry.

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Section of the
Technical Association of the Pulp and Paper Industry

AN ORGANIZATION FOR THE ENCOURAGEMENT OF ORIGINAL INVESTIGATION AND RESEARCH WORK IN MILL ENGINEERING AND THE CHEMISTRY OF PAPER, CELLULOSE AND PAPER-MAKING FIBERS GENERALLY; IT AIMS TO PROVIDE MEANS FOR THE INTERCHANGE OF IDEAS AMONG ITS MEMBERS IN ORDER THAT PROCESSES OF MANUFACTURE MAY BE MADE MORE EFFICIENT AND IMPROVED ALONG TECHNICAL LINES.

Edited by
RONALD G. MACDONALD, Secretary

Comments on the Bleaching of Wood Pulp

By Raymond S. Hatch[1]

So many contradictory findings and so much controversial discussion has recently appeared in the technical literature, on the subject of bleaching wood pulp, that the writer feels somewhat reluctant to stir up further the inky waters. At such times, however, it is frequently of great value to view the matter broadly and endeavor to point out some of the fundamental principles which will aid in bringing some measure of clarity into the picture.

Whenever we contemplate the submission of any substance to chemical reaction, the logical procedure is first to give careful consideration to the physical structure and the chemical nature of the reacting substances. In dealing with simple chemical substances, our problem is comparatively easy but with increasing complexity in physical or chemical structure, we must, of necessity, proceed with great caution and we must utilize all of the knowledge of physical structure and chemical constitution which may be available.

The bleaching of cellulose has long been a matter of trial and error and only until recently has research begun to reveal the complex physical structure of cellulose fibers and to point to some of the precautions which must be considered when we attempt to strip them of their protecting and incrusting impurities. The brilliant work of Scarth[2] of McGill University on the bordered pits of wood fiber and the equally brilliant work of Ritter and Chidester[3] of the U. S. Forest Products Laboratory, has shown that the cellulose fiber which we had been accustomed to regard as a simple tubular structure of uniform wall composition, is by no means of this simple physical nature but is rather, a very complicated structure composed of numerous fibrils bound together in an unknown manner by a cementing material which probably is more susceptible to chemical action than the fibrils themselves. The work of Ritter and Chidester has further shown that there is little question of the existence of two distinct varieties of lignin in the wood substance, one in the middle lamellae which bind the fiber bundles together and the other an incrusting lignin on the individual cell wall.

It is not within the scope of this discussion to go further into the question of the physical or chemical structure of the cellulose fiber, since the state of our knowledge is still somewhat uncertain, but the work done so far leaves little doubt of the extreme complexity, both physical and chemical, of the substances with which we have to deal and emphasizes the necessity of considering carefully all of the structural and chemical changes likely to occur in a process of removing closely related impurities from the structure.

Cellulose, in the original wood substance, is well protected from chemical action by its accompanying lignin. As more and more is removed by chemical means we approach more closely to the complex pure cellulose fiber which must not be subjected to a too drastic chemical action if we hope to preserve its original strength. We have been accustomed to regard "pure cellulose" as a substance of considerable resistance to ordinary chemical influence but it has been found in the last few years that such is by no means always to be expected.

When the ligno-cellulose complex, as represented by wood substance, is subjected to chemical action, the lignin complex, because of its chemical nature, is the first to react. This is, without doubt, due to the reactivity of the CH:CH group and the ketonic or aldehydic CO group occurring in lignin and not present in cellulose. Furthermore, as long as there exists free lignin, capable of reacting with the reagents used, we get a minimum of hydrolytic attack on the cellulose component of the complex. If, however, the products resulting from the combination of the lignin with the reagent, are removed from the cellulose, through their solubility in the suspending medium, the cellulose becomes more and more susceptible to hydrolytic attack or to oxidizing action as these lignin compounds are removed.

Cross and Engelstad[4] have investigated this phenomenon in detail and have shown the susceptibility of cellulose to the hydrolytic action of sulphurous acid solutions when the cellulose has been freed of its accompanying lignin. In this case, the sulphonated lignin is soluble in the sulphurous acid solution used in digestion and, as the removal of lignin approaches completion, the cellulose, no longer protected by the specific reactivity of the lignin, begins to break down through acid hydrolysis.

It is a well known fact that higher yields of cellulose can be obtained by the Cross and Bevan method of purification than by the removal of the lignin by the action of sulphurous acid or bisulphites from the same raw material. In the Cross and Bevan method, moistened ligno-cellulose is acted upon by chlorine gas, which results in the chlorination of the lignin *in situ* but *not* in its removal. After the chlorination is complete, the chlorinated lignin is removed by solution in an excess of neutral sodium sulphite solution. It should be noted that this reaction is, in the main, one of chlorination and not of oxidation and that solution of the chlorinated lignin is effected by means of a neutral salt at comparatively low temperatures. Under these conditions, the cellulose itself is not subjected to oxidation or to acid or alkaline hydrolysis.

[1] Member TAPPI; Technical director, International Bleaching Corporation, New York, N. Y.
[2] Technical Association Papers, Series XI, 1928, p. 94.
[3] Technical Association Papers, Series XII, 1929, p. 121.
[4] Journal of the Soc. of Chem. Industry, Vol. XLIII, No. 31, and Vol. XLIV, No. 23.

On the other hand, the same ligno-cellulose, when subjected to the bisulphite process, has its lignin component converted into a soluble lignin sulphonic acid which, on account of its solubility in the solution, is removed from the cellulose as the reaction proceeds and, as the cellulose approaches the state where it is free from the more reactive protecting lignin, it is exposed to acid hydrolysis, which results in lowering the yield and probably altering the original constitution of the cellulose present.

It is of importance to point out here that too little consideration has been given in the past, in investigations of the bleaching process *per se*, to the source of the raw material bleached and without doubt, many faults have been attributed to the bleaching process which properly should be traced to the original method of crude cellulose preparation.

Cellulose and Alkaline Hydrolysis

The foregoing discussion has been directed chiefly to processes of removing lignin from the ligno-cellulose complex through the action of sulphurous acid or bisulphites. A comprehensive study of the field is by no means complete without equal consideration of the various processes in which alkali is the reagent used to remove the lignin component.

It seems hardly necessary to refer to specific cases of the alkaline hydrolysis of purified cellulose, there is no question of the progressive hydrolysis of cellulose in alkaline solution at elevated temperature. In the alkaline digestion process, the lignin component is the first to be attacked and here again, as the lignin is removed, the cellulose itself becomes subject to alkaline hydrolysis through the removal, by solution, of its protective incrustation. Prolonged action of alkali in excess and at elevated temperatures results in the lowering of yield and the alteration of the constitution of the original cellulose.

Definition and Objects of Bleaching

In the preceding paragraphs we have endeavored to consider some of the properties and reactions of our raw material. We shall now consider the bleaching process itself.

The bleaching of wood pulp has for its object the removal of the residual lignin and coloring matter left in the wood pulp after the major removal of the lignin by any of the well known processes of resolution. To be an economic success the process must meet the following requirements: (a) It must give a product with a satisfactory color. (b) The product must have maximum strength. (c) It must have uniform chemical purity. (d) The process must be carried out with the minimum use of chemicals, labor, power, steam and space.

Chlorine, in the form of a solution of a hypochlorite, has long been, and in all probability, will continue to be, our cheapest and most easily applied oxidizing agent. The remainder of this discussion will be confined, therefore, to a consideration of the mechanism and economics of the application of this agent to the bleaching process.

The action of dilute hypochlorite solutions was originally, and for many years, regarded as one of oxidation exclusively and the bleaching process was carried on with little regard to temperatures or concentrations and little knowledge of rates of reaction and of the specific action of the bleaching agent on the different components of the ligno-cellulose complex. The tremendous growth in the demand for artificial silk and the increasing demand of paper manufacturers for a higher and more uniform grade of bleached wood pulp have turned the attention of both the practical operator and the research chemist to the problem; and the last five years have been ones of great activity in the pulp bleaching field.

Historical Development of the Bleaching Process

Before we consider the more recent developments in the field, it is advisable to review, briefly, some of the earlier processes and to point out the reasons for their abandonment in favor of more recent practices.

From this point on, we shall have frequent occasion to use the terms, "low consistence" and "high consistence." For the purposes of this article, we will define low consistence as a mixture of fiber and fluid in which the fluid is preponderant and the fiber moves with comparative freedom in the fluid medium. High consistence is a condition in which the mass of fiber is preponderant and the fluid is all or nearly all absorbed by the fibrous mass. In the case of low consistence we are dealing with a substance which has, chiefly, the properties of a true fluid while in the case of high consistence we are dealing with a substance which has very little of the properties of a fluid and in most cases is entirely without fluid properties. As the percentage of fiber in fluid increases, we find no sharp break between low and high consistencies but for long fibered pulps, such as sulphite and kraft, we may consider the upper limit of low consistence to be at about 8 per cent and strictly high consistence is reached at about 10 to 12 per cent.

From the above definitions, it is apparent that pulp at low consistence is easily mixed and transferred in equipment which has long been known and standardized. It is natural, therefore, that all of the earlier processes for the bleaching of wood pulp were those utilizing low consistence. The ordinary Holland type beater was long in use for the bleaching of rag half stuff and it is natural that such a machine would be among the early types used for bleaching pulp. It was used to some extent particularly in mills where the amount of pulp handled was small. In the case of large tonnages, however, the beater was out of the question because of its small capacity and the logical step was the use of large tanks or chests, equipped with agitators. Bleaching in this type of equipment was done at consistencies of 3 to 5 per cent with little attempt to go to higher consistence because of the mechanical difficulties encountered in agitation of the mixture. At the low consistence mentioned, the time required for bleaching to a good color at normal temperatures was excessively long and it was necessary to materially increase the temperature, by the use of steam, and to use an excess of bleach. Modifications of the single tank batch system just described were introduced in the form of a series of tanks to which the stock and bleach were fed continuously and the charge passed from one tank to the next. Here, again, it was necessary to use high temperatures and excess bleach to complete the bleaching in reasonable time limits. The bellmer bleacher was a distinct improvement over the older tank types of bleachers but in this machine the practical consistence limit is about 7 per cent and it is necessary to use steam to complete the reaction within reasonable time limits.

In all of the equipment just described, the bleaching was done at consistencies never exceeding 7 per cent and in most cases as low as 3 to 4 per cent. From an economic point of view there were a number of disadvantages. The amount of equipment necessary for the bleach plant and its maintenance was out of proportion to the rest of the plant. The space necessary to house the equipment was decidedly out of proportion to the rest of the plant. In addition, it was found that the high temperatures used resulted in loss of chlorine due to some conversion of hypochlorites to chlorates.

At about the time when the attention of the pulp manufacturer began to center on the high cost of bleaching pulp at these low consistencies, the users began to demand a better and more uniform product. Pulp chemists and operators turned their attention to the problem and began to investigate the possibilities of higher consistencies. It was known, from experience with the Bellmer type machine, that a better quality of pulp could be produced with a lower consumption of steam and chlorine and with less plant space than could be done with the lower consistence tank type bleaching equipment. The first successful attempt to bleach at higher consistence, used the old tank type bleacher but used specially designed, extremely heavy agitating equipment to secure mixing, and screw conveyors to transfer the pulp from one tank to another. In this apparatus it was possible to bleach pulp at

consistencies of from 10 to 11 per cent and the advantages were immediately apparent. First, the product was stronger. Second, the product bleached at this consistence was found to be considerably cleaner than the same material bleached at lower consistence. Third, the amount of bleach required to obtain a standard color was less. Fourth, the bleaching cycle was shorter and the use of steam could be materially cut down.

The marked economic success and the improved quality of pulp produced by this bleaching system stimulated engineers to seek means to handle the bleaching process at still higher consistencies. The first problem with which they were confronted was, however, the application of power to agitate and thoroughly mix the hypochlorite solution with the fiber. For consistencies higher than 11 per cent, the vertical tank with agitating arms on a vertical shaft was not practical. Screw conveyors were found to circulate and mix the high consistence mass with small expenditure of horsepower per ton, provided that only a part of the entire mass was under the influence of the screw at any one time. By this means a part of the charge is always being mixed and the entire charge is subject to this mixing action at regular and frequent enough intervals to prevent unequal distribution of the bleach with relation to the fiber, thus preventing local overbleaching and the consequent damage to the fiber.

The absolute necessity of this frequent mixing will be apparent if we consider the nature of high consistence stock. We have a mass of fiber in which the properties of a fluid are, for all practical purposes, entirely absent, and there is almost no opportunity for the diffusion and equalization of bleach liquor. Experience has proven that no method of initial mixing of the bleach liquor with the fibrous mass will assure uniform distribution of the bleach throughout the bleaching cycle.

Relation of High Consistence to Cleanliness

There is still another property of high consistence to consider at this time which has a distinct bearing on the superior cleanliness of pulp bleached at high consistence. If we attempt to mix or agitate high consistence pulp by mechanical means, we note that liquor is always squeezed out of the mass at the point of application of the mechanical mixing to the pulp mass. This liquor passes out of the zone of agitation and is immediately reabsorbed by the surrounding mass. We thus get a constant change of the liquor, containing bleach, within the different zones of the mass, together with flexing and slight compression of the fiber which greatly aids in the penetration of the bleach liquor into the fiber bundles making up the shives present. Ultimately they are freed of their cementing lignin and become individual bleached fibers.

High Consistence and Hydration

The question of the effect of high consistence bleaching on the hydration or slowing of pulp has been the source of a great amount of controversy, and many attempts have been made to throw some light on this question through controlled laboratory bleachings at high consistence. Unfortunately, it is impossible to duplicate in the laboratory results obtained on a commercial scale. The development of the high consistence process has been one in which the minimum of mechanical power has been used and full advantage has been taken of the effect of gravity on large masses at considerable depths, to aid in the process of mixing and circulation. Economy in the use of power for the process has dictated this method of mixing and circulation with the result that the power input to the process per ton of pulp bleached has been very small. A small laboratory bleacher was constructed to carry on high consistence experiments and was powered with a one-eighth horsepower motor. This apparatus would effectively mix and circulate the high consistence stock but when the power input was figured on the basis of the charge it was found to be about 1,000 kilowatt hours per ton where a mill size bleacher would effectively mix the same consistence with an input of about 50 kilowatt hours per ton.

Hydration, as we are accustomed to accept the term, may be one of three things or any of their combinations. First, there is a chemical hydration in which water is combined with the cell wall and causes a swelling or gelatinization which manifests itself in lowering the freeness test. Second, there may be "fibrillation" in which the fiber is broken down mechanically, and the fibrils caused to be "brushed" out. Third, there may be actual mechanical breakage of the fiber into short lengths. Any one of these causes or any combinations of them will result in reducing the freeness of the original material. We have no reason to believe that the chemical action at high consistence would give rise to chemical hydration of the fiber because in all aspects of the process, the action is milder than is the practice in low consistence bleaching. We are, therefore, confined to looking for the hydration in mechanical effect and here we find that the kilowatt hours per ton of pulp produced at a given temperature are less at high consistence than at low consistence. We have the further evidence of numerous microscopical examinations of the fiber which have failed to reveal evidence of broken down fiber and numerous freeness tests, made on pulp properly bleached at high consistence, which have failed to reveal any appreciable reduction in the freeness as a result of the process. At the same time it is evident that laboratory experiments may lead to erroneous conclusions in this respect, where the power input must be from 15 to 20 times that used on a commercial scale in order to secure satisfactory mixing.

Multi-Stage Bleaching

There are a number of references to be found, in the literature on cellulose, to the effect that the bleaching of pulp in more than one stage is of distinct advantage. By this is meant that a part of the hypochlorite is added, exhausted, washed out and the balance of the hypochlorite added to the washed, semi-bleached pulp for the completion of the bleaching. It was known that a better color could be produced in this manner and this led to its commercial adoption. It soon became apparent that there were other advantages in the multi-stage bleaching process beside the fact that it gave a better color. Experience soon demonstrated that, with a given grade of unbleached pulp, savings of from 15 to 25 per cent in the total hypochlorite requirements could be realized by the two stage process in contrast to single stage. Such savings in chemicals, for a large pulp mill, would naturally justify a reasonably large capital expenditure with the result that the two stage process is a well established practice today.

There are a number of factors connected with the operation of the two stage process which do not seem to be generally known and a great deal of difference of opinion has existed as to the best manner of carrying out the details of the process. Some operators use as high as 80 per cent of the total hypochlorite in the first stage, while others go as low as 40 or 50 per cent of the total hypochlorite in the first stage. The exhaustion time for the first stage has always been found to be materially shorter than that for the second stage operation. It is to be noted, however, that, within reasonable limits, the exhaustion time for the second stage is independent of the amount of hypochlorite used in the first stage. One mill, bleaching a pulp with a 6 per cent chlorine ratio, used 80 per cent of the total hypochlorite in the first stage and the second stage required 3½ hours for exhaustion at 15 per cent consistence. Another mill bleaching a pulp of the same chlorine ratio, used only 60 per cent of the total hypochlorite in the first stage and required 3½ hours to exhaust the hypochlorite in the second stage at 15 per cent consistence.

Up to the present time there have also been widely varying opinions as to the ideal consistencies for each stage. Some operators have settled on the practice of using a lower consistence in the first stage while others have bleached at high consistence in the first stage and at low consistence in the second stage. Still others have taken a neutral stand and operated at the same consistence in both stages. All of these methods have resulted in effecting a

saving in chlorine and in producing a pulp of better color than is obtained in single stage bleaching. Our goal, however, is to produce the best possible quality at the lowest cost and to that end, a study of the reaction rates of bleaching at various consistencies, followed by experiments and mill trials, has led to the conclusions outlined in the following paragraphs and offered as the most logical solution of the bleaching problem.

In Fig. 1, curves A, B, C, and D show the rate of bleach consumption on a pulp of 6 per cent chlorine bleachability, for single stage bleaching, at consistencies of 15, 10, 5 and 3 per cent, respectively, the temperatures of the bleaching being, in all cases, 70 to 75 deg. F.

The most obvious fact brought out by a study of these four curves is that, at all consistencies, bleach consumption is not a straight line function of time and that the rate of consumption slows down in a marked degree at a point determined by the consistencies of the pulp undergoing bleaching.

For example, in curve A, at 15 per cent consistence 90 per cent of the total bleach requirement is consumed in a little over 40 minutes and the remaining 10 per cent requires about 100 minutes. In curve B, where, according to our definition, we are still dealing with high consistence, 90 per cent of the bleach is consumed in a little over 80 minutes and the remaining 10 per cent requires about 210 minutes. In curves C and D, where the bleaching is done at low consistence, the points at which the reaction slows down sharply are at approximately 75 per cent consumption of the total bleach.

The fact that, in all cases, we got a rapid consumption of bleach in the early part of the reaction, followed by a sharp slowing down of the rate of consumption, would, at first, appear to be explained by the difference in bleach concentration in the earlier and later stages of the reaction; but it has been shown that the addition of excess bleach at the point where the reaction begins to slow down does not materially increase the rate of the latter part of the reaction.

It seems, then, that two different types of reaction are occurring and, since there is no sharp break in the curves, these two stages of reaction are without doubt occurring simultaneously. We have no definite proof, as yet, of the nature of the first and rapid part of the reaction, but it appears to be a chlorination of the lignin residues. This has been studied experimentally by Rys,[1] who used chlorine gas in the first part of the reaction and found that he obtained what appeared to be chlorination products, which were insoluble in neutral or acid solutions, but soluble in alkali. Experiments with hypochlorite solutions, in which only about 30 per cent of the total hypochlorite requirements was added to a pulp, allowed to exhaust, and the resulting partly bleached pulp washed free of soluble matter, gave amber to brown wash water containing considerable organic matter, which could be decolorized by the addition of more hypochlorite. We are inclined to believe that this reaction is probably one of chlorination and we have numerous cases in organic chemical practice where hypochlorite solutions are successfully used as chlorinating agents under careful condition of control.

As was mentioned before, the shape of the curve indicates that this chlorination is accompanied by oxidation, in which the colored soluble chlorination products are oxidized to colorless compounds, and if bleaching is carried to completion all of the soluble colored compounds formed in the early part of the reaction are finally oxidized, or broken down into simple colorless compounds.

If, however, we desire to get the greatest economy in chemical consumption, we should pick a point in the reaction curve where we form the maximum amount of colored soluble chlorination products and the minimum amount of oxidation products, since we

[1] Papier Fabrikant XXVI, Nos. 17, 18, 19.

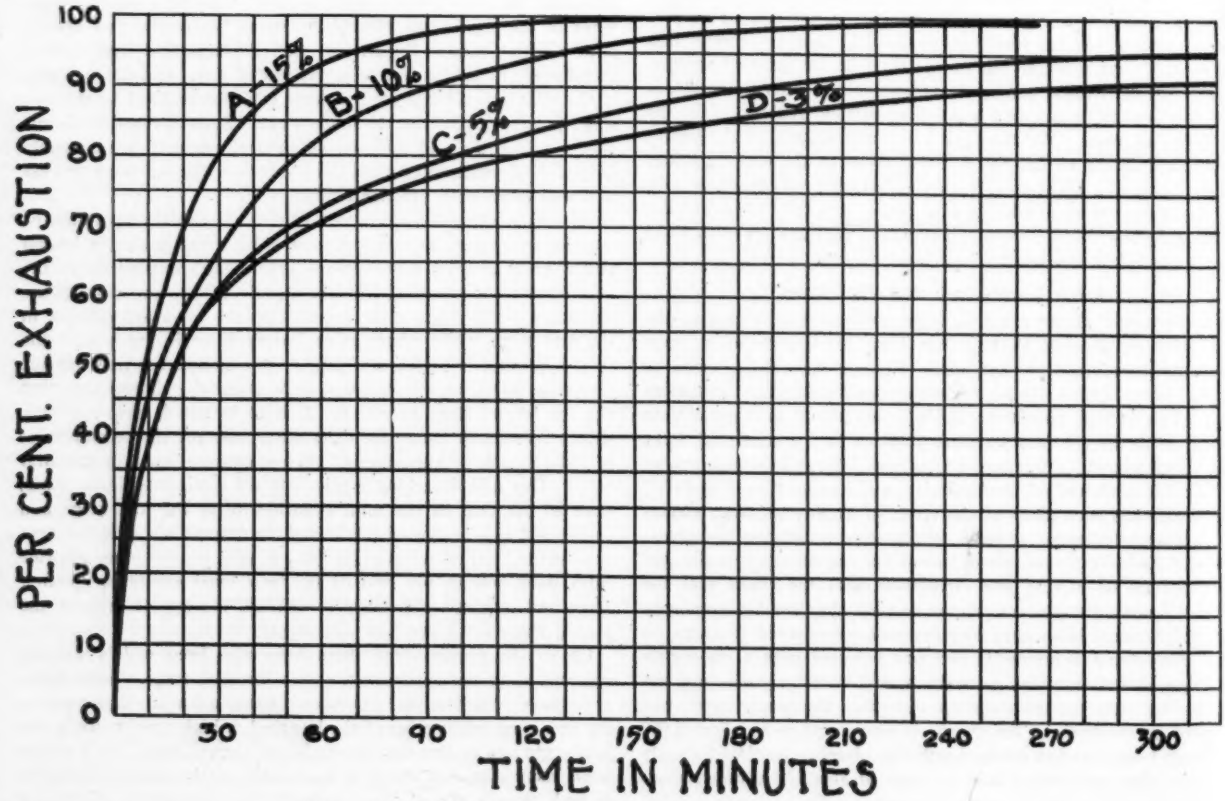

Fig. 1. Bleach Exhaustion Time for Sulphite Pulp at Various Consistencies.

may remove these soluble colored chlorination products by washing and when they are thus removed from the pulp we do not have to use bleach to oxidize them to colorless compounds. The balance of our bleach is then used to oxidize the insoluble colored products, which still cling to the fiber, to soluble colorless compounds, which may then be removed by further washing.

Advantages of Low Consistence in the First Stage

A further study of the four curves shown in Fig. 1 reveals the fact that, as we reach a bleach consumption of 30 per cent of the total requirements, the reaction times for all consistencies are, for all practical purposes, the same and it is natural to assume that it is in this zone where we get the maximum chlorinating and minimum oxidizing effect.

If the assumption just made is correct, we should be able to effect the greatest chlorine saving in two stage bleaching by using 20 to 30 per cent of the total chlorine in the first stage, exhausting in twenty to thirty minutes and washing out the soluble products. This has been amply demonstrated experimentally where savings of from 15 to 20 per cent of the single stage chlorine requirements have been easily made.

If the first stage bleaching operation is to be completed in 20 to 30 minutes, it is evident that high consistence, at this stage, is at a disadvantage, because it is not possible to secure thorough mixture of the fiber and bleach solution rapidly enough, at high consistence, to assure uniform chlorinating action of the bleach solution on all the fiber present. Fortunately, the time required to exhaust up to 30 per cent of the total bleach requirement is so short for low consistence that we are able to take advantage of the fluid properties of low consistence to secure rapid and uniform chlorinating action on the fiber suspension with comparatively low power input for the mixing.

Experience has shown that the time required for second stage bleaching is practically the same, at any given consistence, whether more or less bleach is used in the first stage. The most acceptable explanation of this is that the first stage chlorination process leaves a pulp which, after washing, contains the more resistant colored lignin residues and here the action of the bleach is mainly one of complete oxidation of these colored residues to soluble colorless compounds.

Advantages of High Consistence in the Second Stage

It is in this second stage of the bleaching operation where the advantages of high consistence become strikingly apparent. With high consistence we are able to greatly reduce the time necessary to complete the reaction. A comparison of curves A and B with curves C and D readily shows this. It is true that we can shorten the time at low consistence by increasing the temperature, but by so doing we increase bleach consumption, through conversion of hypochlorites into chlorates. Furthermore, as temperature is increased the oxidizing action of the hypochlorite is more violent and there is a strong tendency to oxidize the cellulose substance itself. A further advantage, and one of the utmost importance, is that in the last part of the reaction we expose the fibers, almost entirely freed of their protecting incrustations, for the shortest period of time to the bleach that still remains.

If we compare curve A with curve C or D, we note that at 15 per cent consistence, the last 5 per cent of chlorine is exhausted in about 70 minutes, while in curve C we still have nearly 5 per cent of the total chlorine requirement present at the end of 290 minutes, and in curve D, at the end of 290 minutes, we still have 8 per cent of the original chlorine present. The danger of partial oxidation, or a modification of the original cellulose structure, plainly lies with low consistence where the cellulose is more completely exposed to the OCI ions rendered highly active through dilution.

General Operating Advantages

The proposal of low consistence first stage, followed by high consistence second stage bleaching offers distinct plant advantages. The first stage reaction can be readily carried out at a consistence of 3 to 3½ per cent at which unbleached pulp is available in most mills and modern hydraulic engineering has furnished us with equipment which will thoroughly mix pulp at this consistence with very little power consumption per ton. The semi-bleached pulp can be pumped from the first stage bleacher direct to the inter-stage washer and only at the end of this operation is it necessary to bring the pulp to high consistence. The second stage bleachers on account of the high consistence used, occupy little space. Since their mechanical action is exerted on only a small part of the charge at one time, and for a relatively short cycle, power consumption per ton is low. It is, however, sometimes desirable to accelerate the second stage cycle in extremely cold weather by warming the high consistence charge up to about 70 deg. F.

Conclusion

In conclusion, the writer wishes to emphasize again that our knowledge of the bleaching action is by no means complete and we shall probably find better and more economical methods as we come to know more of the physical and chemical structure of the raw materials with which we are dealing. The purpose of this article has been to marshall what scientific facts we have available at present and to show how the commercial application of our present knowledge will give us the highest quality at the lowest cost.

Summary

The complex physical and chemical structure of the cellulose fiber has been described briefly. The lignin complex is discussed and its function as a protecting medium for the accompanying cellulose is described. The susceptibility of cellulose, from which nearly all protecting lignin has been removed, to oxidation and hydrolytic attack is pointed out.

The historical development of the bleaching of wood pulp is briefly traced. Curves showing the rates of exhaustion of bleach at different consistencies are shown and the significance of the reaction rates is discussed.

It is shown how a study of reaction rates leads to the development of a system of two stage bleaching in which the first stage is done at low consistence and the second stage at high consistence and the advantages of this system over other bleaching systems are pointed out.

Package Paper Salesmen Meet

HOLYOKE, Mass., October 28, 1929.—The annual two day sales conferences of the Package Paper Company opened at the mill of the company here Friday, October 18 with several conferences and a banquet was held at night in the Hotel Nonotuck at which ten of the Eastern district representatives were present.

A. Havemeyer, president of the company, presided and outlined the plans for the coming year. Saturday an inspection of the new plant was made and the final conferences were held.

The Package Paper Company came to Holyoke during the year from Springfield and is located in the Gas and Electric Department Building on North Canal Street. The company which specializes in printed and waxed papers is working on a night and day schedule.

TAPPI Changes

R. N. Miller, formerly a member of the research staff of the Champion Fibre Company, Canton, N. C., is now in the development department of the Oxford Paper Company, Rumford, Maine.

John D. Rue, formerly with the Champion Fibre Company of Canton, N. C., was a visitor to the TAPPI office on Saturday.

Robert M. Boehm who has been with the Celotex Company has become director of research for the Masonite Corporation of Laurel, Miss.

Current Paper Trade Literature

Abstracts of Articles and Notes of Papermaking Inventions Compiled by the Committee on Abstracts of Literature of the Technical Association of the Pulp and Paper Industry

Clarence J. West, Chairman

Machinery

Knotter, Sliver Screen, Screen, Pulp Washer, Thickener, Filter and Saveall. H. D. Wells. U. S. pat. 1,685,736, Sept. 25, 1928. The machine is preferably of the vertical type to obtain greatest efficiency. It comprises a cylindrical vat in which the stock is introduced, inside which is rotor placed eccentrically, close at both ends and built up of a suitable number of filter plates. When the machine is used as a thickener, saveall or filter, a wire cloth is placed over the plates, while if it is used as a knotter, or sliver screen, the filter cloth is omitted. Between the filter plates are rubber strips extending radially outwards from the rotor. The outlet for the thickened stock (when the machine is used as a cencentrator) or tailings (when it is used as a screen or knotter) consists of a vertical opening in the outer casing, which is sealed off by successive rubber strips between the screen plates as the rotor rotates. As the plates pass opposite the outlet in the casing, there is a slight reduction in the pressure outside the plate so that a small amount of water passes outside through the plates, thus automatically keeping the latter clean. If the machine is used as a washer, provision is made for introducing water at a point near the discharge outlet.—A. P. C.

Paper and Pulp Screening Machine. E. B. Fritz. U. S. pat. 1,685,809, Oct. 2, 1928.—The screening member consists of a horizontal cylindrical sheet metal chamber with parallel series of slits disposed circumferentially. The screen has an opening at the top, extending preferably the length of the screen, with aprons bent inwardly into the screen chamber forming a substantially wedge-shaped inlet for the unscreened stock. The chamber is mounted at the bottom on a fixed, hollow, tubular member, with which it communicates and which serves as an outlet for the tailings. The screening chamber is given a reciprocating motion about the bottom tubular member as pivot. The material is screened by the combined action of gravity, centrifugal force and the back and forth tossing produced by the reciprocation of the screening chamber, the stock inlet being constructed so that the stock cannot splash out of the chamber.—A. P.-C.

Spring Hinge for Flat Screens. G. Reynolds. U. S. pat. 1,689,687, Oct. 30, 1928.—The invention covers a spring hinge or resilient mounting for the diaphragm of flat screens. It provides a substantially non-breakable and adjustable construction whereby the blocks can be maintained and centered with respect to the operating cams, and one having a bar holding down the outer ends of the springs to avoid breaking of the springs at the base or zones of attachment, and a more secure underarm having a particular fit with the angle iron to lessen vibration. The construction is such that the springs flex from lines intermediate their fastenings to avoid breakage.—A. P.-C.

Diaphragm-Operating Mechanism for Flat Screens. C. L. Henderson assignor to Paper Patents Co. U. S. pat. 1,686,322, Oct. 2, 1928.—The diaphragm preferably extends under the entire screen, but acts as a series of separate diaphragms because it is held between pairs of cross pieces placed at intervals along the bottom of the screen frame and extending across the width thereof. On opposite sides of each of the diaphragms are plates which are bolted together. The diaphragms are vibrated by connecting the plates by means of suitable levers to the ends of the cores of a solenoid operated by means of a pulsating direct current obtained by rectifying a low frequency (10 to 15 cycles per second) alternating current. The cores of the solenoid preferably move only a small fraction of an inch (e.g., 1/8) for each pulsation of the current. The construction of the screen frame is such as to practically divide the screen into a series of compartments, each being provided with an upper screen plate and a lower separate diaphragm. The connections of the latter with the solenoid cores is such that the diaphragms in adjacent compartments are reciprocated in opposite directions so that a proper balanced action may be secured.—A. P. C.

White Water Treatment. Anon. Paper Tr. J. 87, No. 20, 49-50 (Nov. 15, 1928).—A description of the Marx funnel filter and of its application for fiber recovery from white water.—A. P. C.

Simplified Calculations of Stock Quantities. Floyd G. Scammon. International Paper Co., Chisholm, Me. Paper Industry 10, 1579 (Dec. 1928).—A chart is given for conveniently calculating the number of tons of stock that will be supplied every 24 hours by a given number of gallons a minute of slush stock at known consistency.—A. P.-C.

Instrument Controls in Papermaking. Reginald Trautschold. Paper Trade Journal 87, No. 19, 46-50 Nov. 8, 1928.—A brief outline of the various points at which it is advisable and advantageous to control papermaking operations by means of automatic instruments, from the beaters to the finishing room.—A. P.-C.

Calibrating Instrument for Papermaking Machines. L. T. Murphy. U. S. pat. 1,680,690, Aug. 14, 1928.—The object of the invention is to provide a simple form of paper thickness guage adapted to be applied to standard paper machines without changing or adding to the structure of the machines, the instruments serving to indicate constantly the thickness at which the paper is running. The instrument is of a common type, consisting of a dial and indicator, the latter being suitably connected to one of the press rolls or calender rolls by means of links and compound levers which amplify the vertical displacement of the roll. The dial is calibrated to show the distance between the working surfaces of the two cooperating rolls, and hence the thickness of the sheet passing between them. The instrument may be provided with suitable electrical connections to light signals indicating when the sheet is running between the required tolerances, or above or below such tolerances.—A. P.-C.

Preparing and Separating the Cellulose Material Suitable for Papermaking from Plant Raw Material with Pith Fiber. H. Kumagawa and K. Shimomura. Eng. pat. 299,740, June 30, 1927.—The plant raw material is beaten in a stream of water in a beater or hollander; the water soluble materials dissolve while the short pithy fibers float on the surface of the stream and the long thin ones, suitable for papermaking, remain suspended and are removed by a suitable device.—A. P.-C.

Pulp Refining Engines. W. G. Fraser. Eng. pat. 292,228, March 14, 1927.—In a refining engine of the conical type, two or more refining elements mounted on a common shaft are connected in a series in such a manner that the stock enters the small end of one element and passes out through the larger end thereof, through a pipe to the smaller end of the next element. The two larger ends may abut, or the larger end of one element may abut the smaller end of the next element. Top and bottom flanges are provided to facilitate the changing of the top of the casing to the bottom position in order to maintain even wear of the casing.—A. P.-C.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Fredericksburg, Va.—The Sylvania Industrial Corporation is pushing construction on initial units of its new local plant to be given over to the production of transparent wrapping papers under a special process, and expects to have the mill ready for a trial run within sixty to ninety days. The project will include a boiler plant, machine shop and other mechanical units, and is estimated to cost close to $1,000,000, with equipment. Headquarters of the company are at 122 East 42nd street, New York. Dr. F. H. Reichel is general manager.

Springfield, Mo.—The Springfield Tablet Manufacturing Company, 214 South Jefferson street, Springfield, is considering the construction of a new one-story plant unit, to be used primarily for storage and distributing service, reported to cost about $40,000, with equipment. A portion of structure will be reserved for office service. Harry S. Jewell is one of the heads of the company, in charge.

Salisbury, Md.—The Baltimore Paper Box Company, Key Highway, Baltimore, Md., is perfecting plans for the establishment of a new branch plant at Salisbury, where a building has been leased at Railroad avenue and East William street. The structure will be remodeled and improved at once, and equipped for the manufacture of corrugated shipping containers, folding paper boxes and similar specialties. Facilities will be provided, including cutting and finishing departments, for an initial output of about 15,000 containers per day. It is expected to have the plant ready for service during December, with estimated cost placed in excess of $25,000, including machinery. B. H. Catzen is vice-president.

Little Falls, N. Y.—The Reed Tissues Corporation, recently organized by George H. Jones, 59 Prospect street, Little Falls, and associates, with capital of 2,000 shares of stock, no par value, is said to be planning the operation of a local mill for the manufacture of tissue papers. The company will be headed by Edward E. Reed, 101 Warrington place, East Orange, N. J.; Reginald T. Cone, 45 West Monroe street, Little Falls, is interested in the organization.

Worcester, Mass.—The E. G. Higgins Wall Paper Company, Worcester, is planning the early rebuilding of portion of storage and distributing plant destroyed by fire, October 21, with loss reported in excess of $100,000, including stock and equipment.

Holyoke, Mass.—The National Blank Book Company, Riverside, Holyoke, will proceed with superstructure for its proposed new plant addition for which general contract recently was let to the Casper Ranger Construction Company, 20 Bond street, Holyoke. Miscellaneous contracts are being placed for the work including an award to the Haarmann Steel Company, Holyoke, for structural steel framing. The new unit is reported to cost more than $75,000, with equipment. Fletcher-Thompson, Inc., 542 Fairfield avenue, Bridgeport, is architect and engineer.

Medford, Mass.—The Hersey Paper Company, Medford, has approved plans for construction of new addition to plant on Myrtle street, consisting of a two-story, concrete and mill type unit, 26x50 feet. General contract has been let to J. E. Larson, 8 Harold street, Arlington, and work will be placed under way at once. It is reported to cost close to $20,000, with equipment.

Rochester, N. Y.—Following developments of the Eastman Kodak Company, in connection with a new cellulose compound, suitable for the production of containers of various character, the American Can Company, 230 Park avenue, New York, is said to be negotiating with the company for the utilization of the process for commercial production. It is reported that a plant is being considered for the manufacture of cans and containers of the cellulose composition. Detailed information is temporarily withheld.

Attleboro, Mass.—The American Reinforced Paper Company, Starkey avenue, will proceed with superstructure for proposed new addition to mill for which contract was recently let to C. K. Rathbone, Hospital Trust Building, Province, R. I., consisting of a one-story, brick and steel structure, 46x175 feet, to cost close to $45,000, with equipment. Charles T. Main, 201 Devonshire street, Boston, Mass., is architect and engineer.

Neenah, Wis.—The Sawyer Paper Company, West Wisconsin avenue, is beginning work on a new one-story unit, 40x75 feet, previously referred to in these columns, and for which plans have been filed. It is estimated to cost approximately $20,000, with equipment.

York, Pa.—The Barnes Wall Paper Company, York, closed bids on October 25, for a proposed new addition to its local mill, and will award general contract at early date. It is estimated to cost in excess of $20,000, with equipment. H. E. and R. B. Yessler, Schmidt Building, York, are architects in charge. A. G. Barnes is treasurer.

Brockton, Mass.—The George E. Keith Shoe Company, Brockton, is said to be planning the early rebuilding of portion of its local box mill, used for the manufacture of cardboard containers for shoes, etc., destroyed by fire October 19, with loss reported at close to $30,000, including equipment.

Columbus, Ohio—The Central Ohio Paper Company, 226 North Fifth street, has begun the construction of its proposed new storage and distributing plant at location noted, consisting of a two and three-story unit, 100x120 feet, reported to cost about $100,000, with equipment. It is proposed to have the structure ready for service at an early date. General contract is in charge of E. Elford & Son, 555 Park street, South, Columbus. H. T. Collingwood, 1520 Bryden street, is architect.

Chicago, Ill.—The Paper Tube Company, 1714 North Damen avenue, Chicago, recently organized with a capital of $25,000, is said to be planning the early operation of a local factory for the manufacture of paper tubing and kindred products. The company is headed by E. C. Murphy and E. H. Garnett.

South Walpole, Mass.—The Bird Machine Company, Washington street, manufacturer of paper mill machinery and equipment, has plans for a one-story addition to plant, for which general contract has been let to F. J. Tetreault & Company, 252 Common street, Walpole, Mass., estimated to cost about $20,000, with equipment.

Montreal, Que.—The Gatineau Power Company, a unit of the International Hydro-Electric System, controlled by the International Paper and Power Company, Montreal, with American organization, the International Paper Company, 100 East 42nd street, New York, is disposing of a bond issue of $11,000,000, a portion of the proceeds to be used for expansion, including work now in progress for hydroelectric power development on the Gatineau and Ottawa rivers, a considerable part of the output to be used at the news print mills of the parent organizations.

Montreal, Que.—Plans for a merger have been perfected by the Canada Power and Paper Corporation, Montreal; the Mayagamack Pulp and Paper Company, Ltd., with news print mill at Three Rivers, Que.; and Port Alfred Pulp and Paper Corporation, with similar paper mill at Port Alfred, Que. The consolidated organization plans a general expansion program for increased output. The Canada Power and Paper Company is arranging for an increase in capital from $750,000 to 2,000,000 shares of stock, no par value, a considerable portion of the proceeds to be used for the purpose noted.

Three Rivers, Que.—The St. Lawrence Paper Mills Company, Ltd., is running on a regular schedule at its local news print mill and expects to hold to this basis for an indefinite period. Following the installation of two additional paper-making machines and auxiliary equipment, giving the plant a complete six-machine mill, the capacity is now 150,000 tons of news print per annum. The plant has not been brought up to maximum at the present time, owing to market conditions. Ernest Rossiter is president.

New Companies, Etc.

Brooklyn, N. Y.—The White Star Paper Box Company, Inc., has been incorporated with a nominal capital of $5,000, to manufacture and deal in paper goods. The principal incorporators are: Sidney Bichner and Morris Goldman, 1743 54th street, Brooklyn.

Providence, R. I.—The Blackstone Box and Paper Company has been incorporated with capital of $10,000, to manufacture and deal in paper boxes and containers. The incorporators are: Emil S. Hall, R. H. Hermanson and John F. Cotton, 28 Barnes street, Providence. The last noted is representative.

Chicago, Ill.—The Central Envelope Company has been organized with headquarters at 417 South Jefferson street, to manufacture and deal in envelope stocks. The company is headed by L. A. Shoemaker and M. R. DeTolve, and will be affiliated with the Consumers Paper & Supply Company, 411 South Jefferson street.

Wilmington, Del.—The Wold Fibre Corporation, care of the Corporation Trust Company of America, duPont Building, Wilmington, has been incorporated with a capital of $10,000,000, to manufacture fiber products of various kinds, including containers, etc.

Mid-States Gummed Paper Co. Expansion

The Mid-States Gummed Paper Company, manufacturers of gummed paper and cloth, of Chicago, Ill., have recently added approximately one-third factory space to their modern plant. The company has also built and have now in production what is said to be the largest gummed tape manufacturing machine in the world. A new general office has also been built and furnished.

This expansion has been necessitated by the continued increase in the business of the company. At the present time the company is exceptionally active and has a large number of unfilled orders booked.

Dexter Sulphite Installing Bleaching System

Dexter Sulphite Pulp and Paper Company, manufacturers of Mitscherlich sulphite and paper specialties, of Dexter, N. Y., are installing a bleaching system with a capacity of 25 tons per day, and also a new Kamyr machine with the necessary screens and other equipment.

Paper Makers Brotherhood Election

[FROM OUR REGULAR CORRESPONDENT]

ALBANY, N. Y., October 26, 1929.—Reports from the International Brotherhood of Papermakers indicate that a second election may be necessary to determine the presidency of the organization. While the official vote will not be known before the early part of November when the board of canvassers completes its tabulation it was learned today that each of the candidates for the presidency has polled a vote sufficient in size to do away with the possibility of any receiving a majority as required by the laws of the organization. Several locals are yet to be heard from and the vote cast by these may serve to change the result and make a second election unnecessary. Judging from the size of the packages being received at the headquarters of the organization here and from unofficial reports filtering in from locals the vote cast in this election is about forty per cent greater than in past elections.

In case a second election for the presidency becomes imperative the voters will express themselves on but two candidates, the constitution providing that in case of re-submission to locals the two highest men on the previous vote be given a place on the second ballot. It is said that Jeremiah Carey, who was president of the organization for many years and who has attempted to stage a comeback this fall, has shown himself a far better vote-getter than was conceded by his opponents. The vote cast for Mr. Carey has served to cut in heavily on the other two candidates, W. R. Smith, the present incumbent, who is seeking re-election, and Matthew Burns, the former secretary, who is now seeking the presidency. It is a foregone conclusion that there will be a second election this fall to decide the sixth vice-presidency. There have been four candidates for the office and the vote is about equally divided. The candidates were Oscar Benoit, of Shawinigan Falls, P. Q.; E. B. Lampton, of Gouverneur; Eugene Cote, of Iroquois Falls, Ont.; and E. O. Kelly, of Sault Ste. Marie, Ont.

New England Paper Trade Happenings

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., October 24, 1929.—The Blackstone Paper Company, Providence, R. I., has been incorporated with a capital stock of $10,000 of 100 shares common $100 each and 100 shares common of no par value. The incorporators are John F. Cotton, 28 Barnes street, Providence, Emil S. Hall and Ruth H. Hermanson.

Miss Adeline Muirhead, daughter of Andrew Muirhead, general superintendent of the Robert Gair Company, New York, was married October 19 to Louis Swift Kimball, of Lynn. They are to be at home after December 1 at 168 Norfold avenue, Swampscott, Mass.

G. M. McCarthy is manager of the Boston office of the American Writing Paper Company at 80 Federal street, recently re-opened. Mr. McCarthy came to Boston from the Chicago office of the company.

Harrie E. Waite, sales manager of John Carter & Co., Inc., who is ill of pneumonia, is slightly improved.

John F. Kuster, treasurer, and Frank C. Cate, secretary, of the Andrews Paper Company, who left Monday for a motor trip to Pennsylvania and the South, are expected to return this week.

Chicago Paper Association Meets

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., October 28, 1929.—The Chicago Paper Association held its regular semi-monthly meeting on Tuesday evening, October 22, at the Bismarck Hotel. A high light of the business session was the choosing of a nominating committee to prepare a slate of candidates for the coming fiscal year which gets under way on December 1. The committee, which consists of five members, is headed by Henry Toms of the Peerless Paper Company, chairman.

The association is also laying plans for a big annual meeting scheduled for the third Tuesday in November, November 19, at the Bismarck Hotel. According to Leo Altholz, president of the association, the program will be unusually interesting and will be featured by one and possibly two addresses by men well known to the industry.

Paper Products Mfg. Co. Expands

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., October 18.—Increasing its present plant from 12,000 to 45,000 square feet of floor space and doubling its capital stock structure from 30,000 to 60,000 shares of no par common outstanding is the expansion progrom announced by the Paper Products Manufacturing Company, of Kalamazoo. Mich.

The Michigan Securities Commission has granted permission for the sale of stock and a contract has been closed with Walter L. Nau Company, Penobscot building, Detroit, to act as fiscal agent. David E. Spahr is in Kalamazoo, working with Harold D. Schrier, president and general manager, on the set up.

The new building, which will be located at East Michigan avenue and Schippers lane, will have a frontage of 126 feet on the latter street and a depth of 120 feet. It will be two stories and full basement in height and have a floor space of 45,360 square feet. It will be strictly fireproof, steel and concrete being the materials used.

After giving effect to present financing Paper Products Manufacturing Company will have a financial statement showing total resources of $228,427.58. Current assets will be $99,895.92 against current liabilities of $16,954.44, or approximately six to one.

Paper Products Manufacturing Company was established in 1925, practically without capital. It was legally organized in February, 1926; re-organized in 1928 with an authorized capital of 75 shares, no par common stock. This was amended in August, 1929, to 100,000 shares authorized. An issue of preferred stock has been retired. There are no bonds outstanding. The company is engaged in the manufacture of school supplies, business supplies and cartons.

The officers are: President and general manager, H. D. Schrier; vice president, H. J. Rigterink; secretary, Christian Schrier.

F. A. Empsall Estate Appraised

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., October 26, 1929.—The estate of the late Frank A. Empsall, for many years a prominent figure in the Northern New York paper industry, is estimated to have a gross value of $2,166,503, according to an appraisal just completed by County Treasurer Burton Hayes. Of his stock holdings those in the St. Regis Paper Company were the largest, consisting of 9,500 shares valued at $1,420,250. The appraisal of these shares were made at $149.50 per share. In the Taggart Bag Corporation he held 3,500 shares appraised at $161,000 and in the Northeastern Power Corporation 2,000 shares valued at $112,000. Holdings in other firms represented smaller amounts.

The net value of the estate after making $137,928.25 deductions is placed at $2,028,574. These deductions consist of $43,350 commissions for handling the estate; $53,647 debts; $40,931 funeral administration. Greatest of the items making up his estate was that of $2,057,320 representing his holdings of stocks and bonds which were distributed in many corporations. Next came $62,833 of mortgages, notes and accounts receivable; real property $4,000, personal effects $100 and cash $42,239.

Under the terms of his last will and testament his widow is beneficiary to the amount of $500,000 and his brother, Alfred D. Empsall, $10,000; brother, William D. Empsall, $1,000; brothers, Fred W. and George H. Empsall, $100 each; Frank A. Empsall, Jr., in trust and absolutely, $300,000, while in trust and power to dispose he will receive $508,687 or more; Pauline S. Empsall, Jr., in trust and absolutely, $200,000, while in trust and with power to dispose, $508,687. These figures do not show the deductions of the inheritance tax for the reason that they have not yet been made. These taxes consist of the direct and a contingent tax. County Treasurer Hayes has not made the deduction for the reason that he has not received from Albany what the amount of the tax should be. The Northern New York Trust Company is executor and trustee of the estate and Charles A. Phelps is attorney for the executor and trustee.

New Finishing Room for Bryant Paper Co.

To make way for a structure which will house a central finishing department, the Bryant Paper Company is dismantling the first unit erected back in 1895, the year the company was organized and started business in Kalamazoo, Mich. The disappearance of this structure, which has for nearly 35 years been used as a machine room also marks the passing of the first two Fourdrinier machines installed by the company. They have been sold and moved from the plant.

According to Felix Pagenstecher president of the Bryant Paper Company, the new finishing room will be 280 by 68 feet in dimension, one story high and built of brick, steel and reinforced concrete. The general contract has been awarded to A. J. DeKoning.

"The construction of the central finishing room," said Mr. Pagenstecher, "will enable us to center all our finishing activities under one roof and at the same time eliminate three finishing rooms that today are not so advantageously located. While we may have to purchase some new machinery, practically all the equipment required for the new finishing room is now located in the departments to be abandoned.

"Another improvement in order at this time is the rebuilding of the No. 10 machine in the Milham division. At this time it is a Harper type and is to be transformed into a straight Fourdrinier, completely electrified. This machine now trims 126 inches, but we hope to increase that slightly, and at the same time double the tonnage capacity of the machine. We will then be operating nine machines instead of eleven a year, but without any reduction in our tonnage and at a reduction in costs."

Oswego Plant to Make Wire Ties

OSWEGO, N. Y., October 26, 1929.—Announcement was made this week that the manufacture of wire ties, a product of the Bates Valve Bag Corporation, in its new plant here, will be started within the next few days or as soon as a switchboard for the elaborate electrical installation has been received and placed in working order. The new plant is being used as the machine division of the St. Regis Paper Company. A power line is also planned to connect the Taggart plant with the machine plant.

A force of forty skilled mechanics are busily engaged in getting the plant ready for operations and eighteen machines for the making of wire ties, used for fastening flour and other sacks and for binding concrete materials together, have been installed. One half of the machines used in the process are still operating in the Chicago plant but these will be dismantled and shipped to Oswego as soon as the Oswego machines have been placed in operation. The company will also manufacture a number of other products including machines of an automatic type for filling bags with cement, plaster and other materials of similar nature, and the bag making machines such as are used in the plant of the Taggart Paper and Bag Company in this city.

Fred E. Forbes Dead

BROWNVILLE, N. Y., October 26, 1929.—Fred E. Forbes, master mechanic of the Brownville Board Company, died during the past week at his home here following a stroke of apoplexy. Previous to being stricken he had performed his duties at the mill and as far as could be learned made no complaint of being ill. He was taken ill after eating a hasty lunch and although medical aid was summoned his condition gradually grew worse. He has been in the employ of the company for the past fourteen years and was regarded as one of the most valuable and efficient workers. He is survived by his wife, two brothers and a sister.

New York Trade Jottings

E. C. Whiting is now acting as sales manager for the Whiting Paper Company, with headquarters at 154 West 14th street, New York, in place of Harold P. Graves, who has returned to Washington.

* * *

Jacob Seibert announces that he has severed his connection with the International Paper Company, New York, and that he will return to Chicago and operate as the Seibert Paper Company after a short holiday.

* * *

Dr. Hugh P. Baker, head of the Trade Association Department of the Chamber of Commerce of the United States and former secretary of the American Paper and Pulp Association, was a New York visitor last week.

* * *

James Derrico, of Derrico & Co., paper mill supply dealers, of 338 East 110th street, New York, was married to Miss Josephine Cusano at St. Ann's Church, New York, on Sunday, October 20. A reception followed at the Manhattan Odd Fellows Temple.

* * *

The Fall Meeting of the National Association of Waste Material Dealers was held at the Astor Hotel, New York, Tuesday, October 22. There was a good attendance at the general meeting in the afternoon. The scheduled joint meeting of the Waste Paper, Cotton Rag, Woolen Rag, and Foreign Trade Divisions, was cancelled.

* * *

News Syndicate Co., Inc., New York, publishers of the *Daily News,* has withdrawn its suit against International Paper Company. The action was brought last May, but has never come up for trial. Upwards of $780,000 was asked by the *News* as the amount due because of alleged discrimination and excessive charges on paper supplied it by the International Paper Company. In its answer to the suit the International made a general denial.

* * *

Fred M. Feiker, managing director of Associated Business Papers and chairman of the Advisory Committee on the Census of Distribution, was the principal speaker at the regular weekly meeting and luncheon of the New York Division of the Salesmen's Association of the Paper Industry, held in the old Broker's Room of the Belmont Hotel last Monday. Mr. Feiker explained the development of the Census of Distribution and mentioned the difficult problems the committee had to face, and how they were being overcome. There was a very large attendance of members who plainly demonstrated their appreciation of Mr. Feiker's timely address.

* * *

The Texas Gulf Sulphur Company, Inc., New York, reports for the quarter ended September 30, 1929, net income of $4,028,959 after depreciation and Federal taxes, but before depletion, equivalent to $1.58 a share on 2,540,000 shares of no par stock. This compares with $3,571,270, or $1.40 a share, in the preceding quarter and $3,680,723, or $1.45 a share, in the third quarter of 1928. Net income for nine months ended September 30 totaled $11,480,489 after above charges, equal to $4.52 a share, comparing with $10,355,381, or $4.08 a share, in the first nine months of the previous year. During the last quarter the company increased its reserves for depreciation and accrued Federal taxes by $567,194, making total of these reserves $12,389,090 on September 30, 1929.

* * *

A group of German paper manufacturers arrived on the steamer *Reliance* last Sunday, October 27, to make a three weeks' tour of the United States, during which time the party will visit the principal cities and inspect many of the large paper plants and other industrial works of interest. In the party are: B. Tugendhat, director of the paper factory at Unterkochen, Wuerttemberg, accompanied by Mrs. Tugendhat; Carl Hangleiter, director of the Simonius Cellulose Works, Fockendorf; Arthur Gayler, affiliated with the machine factory "Zum Bruderhaus" at Reutlingen; Heinrich Nikolaus, owner of the Seltmans Paper Factory in Allgaeu; H. Werther, affiliated with the Karl Krause Machine Works, Leipzig. While in New York the paper manufacturers will spend a few days touring the city and its environs and inspecting large printing and paper manufacturing plants, among them the plant of the *New York Times,* before leaving for Boston on November 2. The itinerary to be followed includes Albany (November 6), Niagara Falls (November 7 to 10), Detroit (November 11), Chicago (November 12 to 14), St. Louis (November 15 and 16), Pittsburgh (November 17 and 18), Washington (November 19), Philadelphia (November 20), Atlantic City, (November 21), returning to New York, November 22, from which port they will sail for home on the steamship *Deutschland,* November 23.

* * *

Problems of the paper industry were freely discussed at a conference held at New York University last Thursday. Leading manufacturers, paper merchants and association officials were invited to the meeting. Professors Badger, Sprague and Ferris, and R. G. Berg, explained the aims of New York University and offered to extend the facilities of the university in an educational way to the paper industry. The different courses at present being offered were thoroughly explained. A committee was appointed to co-operate with the university in extending and improving the various courses to meet the needs of the paper industry, with power to add to their numbers, as follows: Charles W. Boyce, secretary of the American Paper and Pulp Association, chairman; Dr. E. O. Merchant, economist of the Paperboard Industries Association; Ronald G. MacDonald, secretary of the Technical Association of the Pulp and Paper Industry; Douglas A. Crocker, secretary of the Salesmen's Association of the Paper Industry; K. S. Warner, of the John F. Sarle Company; Charles Addoms, of the Miller & Wright Paper Company; Irwin Slote, secretary of the Paper Association of New York City; T. S. Lathrop, of the Lathrop Paper Company, Inc., and Michael Pomerance, of the Forest Paper Company.

Chicago Paper Salesmen's Plans

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., October 28, 1929.—Quite a series of noon programs are arranged for the Chicago Division of the Salesmen's Association of the Paper Industry for the coming few weeks. The series got under way last Monday when Ronald Drake, of the W. F. Hall Printing Company, spoke to the salesmen on "Paper Troubles in the Printing Press."

According to Harold Knott, of the Eastern Manufacturing Company, chairman of the Division, Mr. Bryan, of the Wisconsin Traffic Association, will bring an interesting discussion of "Traffic Problems" to the association on November 4. On November 11, Warren Bullock and Mr. Sutcliffe, of the Import Committee of the Paper Industry, will undoubtedly draw an unusually large crowd to the Monday noon meeting at the Hamilton Club. Mr. Sutcliffe is the foreign field representative and he will discuss European conditions for the benefit of the salesmen and their guests.

H. R. Boston Leaves Stevens & Thompson

[FROM OUR REGULAR CORRESPONDENT]

HOOSICK FALLS, N. Y., October 21, 1929.—Henry R. Boston, who for the past several years has been purchasing agent and chief accountant with the Stevens & Thompson Paper Company, has resigned to accept a position with Ames, Emerich & Co., an investment security organization in New York City. He will serve as auditor and analytical supervisor of securities in his new position. During his residence in this city he has been extremely active in organization and community affairs. He will remove to New York during the latter part of this month and will be accompanied by his family.

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In tank cars and multiple unit cars.

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Alkalies and Chemical Products Manufactured by The Solvay Process Company
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WILL TEST ALL STOCKS

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The Complete SCHOPPER Line Includes:

MICROMETERS	FOLDING TESTER
ALL KINDS OF SCALES	DENSOMETER
CONDITIONING OVENS	ASH TESTER

AND MANY OTHER ITEMS

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72 Duane Street New York, N. Y.

Sole Agents

UNITED STATES CANADA

Imports of Paper and Paper Stock

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING OCTOBER 26, 1929

SUMMARY

Cigarette paper .....1,935 cs.
Wall paper .....131 bls., 17 cs.
Paper hangings .....32 bls., 1 cs.
Hanging stock .....396 rolls
Printing paper .....66 bls., 77 cs.
News print .....726 rolls, 214 bls.
Wrapping paper .....65 cs.
Packing paper .....67 cs.
Photo paper .....5 cs.
Filter paper .....112 cs.
Transfer paper .....23 cs.
Decalcomania paper .....17 cs.
Colored paper .....76 cs.
Writing paper .....36 cs.
Condenser tissue paper .....40 cs.
Tissue paper .....95 cs.
Surface coated paper.....33 bls., 25 cs.
Baryta coated paper .....414 cs.
Aluminum paper .....54 cs.
Silk paper .....2 bls.
Gold coated paper .....11 cs.
Coated paper .....3 cs.
Caoutchouc paper .....8 cs.
Transparent greaseproof paper .....127 cs.
Card board .....105 cs.
Stencil paper .....5 cs.
Gallic paper .....2 cs.
Wax coated paper .....6 cs.
Envelopes .....87 cs.
Basic paper .....2 cs.
Paper and photo plates .....210 cs.
Miscellaneous paper....2,486 rolls, 350 bls., 148 cs.

CIGARETTE PAPER

American Tobacco Co., Schodack, Bordeaux, 300 cs.
De Manduit Paper Corp., Schodack, St. Nazaire, 652 cs.
De Manduit Paper Corp., MacKeesport, Havre, 218 cs.
De Manduit Paper Corp., Vincent, Havre, 352 cs.
American Tobacco Co., Roussillon, Bordeaux, 400 cs.
Max Spiegel & Son, Roussillon, Bordeaux, 13 cs.

WALL PAPER

A. C. Dodman, Jr., Inc., Berengaria, Southampton, 10 bls.
R. F. Downing & Co., Muenchen, Bremen, 9 cs., 5 bls.
F. J. Emmerich, Resolute, Hamburg, 4 bls., 1 cs.
F. A. Binder, America, Bremen, 5 bls.
Schmidt & Pritchard, America, Bremen, 2 cs.
F. J. Emmerich, Milwaukee, Hamburg, 22 bls.
Irving Trust Co., Milwaukee, Hamburg, 25 bls.
J. E. Bernard & Co., Milwaukee, Hamburg, 55 bls.
S. Stern Stiner, Milwaukee, Hamburg, 2 bls.
Globe Shipping Co., Milwaukee, Hamburg, 2 bls.
A. C. Dodman, Jr., Inc., Berlin, Bremen, 1 ble.
Davies Turner & Co., Majestic, Southampton, 1 cs.
R. F. Downing & Co., Majestic, Southampton, 4 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., Minnewaska, London, 12 bls., 1 cs.
A. C. Dodman, Jr., Inc., Andania, Liverpool, 20 bls.

HANGING STOCK

F. & R. Trading Corp., America, Bremen, 396 rolls.

NEWS PRINT

Parsons & Whittemore, Inc., Berlin, Bremen, 661 rolls, 214 bls.
Journal of Commerce, Minnequa, Helsingfors, 65 rolls.

PRINTING PAPER

Keller Dorian Paper Co., MacKeesport, Havre, 17 cs.
National City Bank, Milwaukee, Hamburg, 66 bls.
Martin & Bechtold, Dresden, Bremen, 21 cs.
E. Dietzgen & Co., Volendam, Rotterdam, 21 cs.
Steffens Jones Co., E. Francqui, Antwerp, 8 cs.
J. Beckhardt, Berengaria, Southampton, 10 cs.

WRAPPING PAPER

Keller Dorian Paper Co., MacKeesport, Havre, 3 cs.
E. Dietzgen & Co., Volendam, Rotterdam, 62 cs.

PACKING PAPER

American Express Co., Resolute, Hamburg, 55 cs.
Atlantic Forwarding Co., Milwaukee, Hamburg, 12 cs.

PHOTO PAPER

E. Hennigson Co., Bremen, Bremen, 2 cs.
J. J. Gavin, Berengaria, Southampton, 3 cs.

FILTER PAPER

E. Fougera & Co., Roussillon, Bordeaux, 92 cs.
Blackman & Blackman, Roussillon, Bordeaux, 20 bls.
H. Reeve Angel & Co., Inc., Minnewaska, London, 13 cs.
C. Schleicher Schull Co., Inc., Resolute, Hamburg, 7 cs.

TRANSFER PAPER

F. L. Kramer & Co., America, Bremen, 23 cs.

DECALCOMANIA PAPER

C. W. Sellers, America, Bremen, 15 cs.
C. W. Sellers, Milwaukee, Hamburg, 2 cs.

COLORED PAPER

F. L. Kramer & Co., Dresden, Bremen, 9 cs.
S. Gilbert, Dresden, Bremen, 11 cs.
Universal Car Loading Co., Dresden, Bremen, 8 cs.
E. Hennigson, Dresden, Bremen, 6 cs.
J. J. Shore, Dresden, Bremen, 20 cs.
J. Beckhardt, Dresden, Bremen, 16 cs.
S. Gilbert, Berlin, Bremen, 4 cs.
E. Hennigson, Bremen, Bremen, 2 cs.

WRITING PAPER

American Express Co., MacKeesport, Havre, 11 cs.
W. J. Byrne, MacKeesport, Havre, 2 cs.
The Eleto Co., Resolute, Hamburg, 3 cs.
Titan Shipping Co., Majestic, Southampton, 1 cs.
Japan Paper Co., Majestic, Southampton, 3 cs.
The Eleto Co., Majestic, Southampton, 1 cs.
Canson & Montgolfier, De Grasse, Havre, 12 cs.
Distinctive Writing Paper Co., Berengaria, Southampton, 2 cs.
J. E. Bernard & Co., Berengaria, Southampton, 1 cs.

CONDENSER TISSUE PAPER

F. C. Strype, Augustus, Genoa, 14 cs.
Parsons & Whittemore, Inc., Andania, Liverpool, 26 cs.

TISSUE PAPER

Old Master Paper & Pulp Co., Milwaukee, Hamburg, 47 cs.
F. C. Strype, Minnequa, Helsingfors, 48 cs.

SURFACE COATED PAPER

Quality Art Novelty Co., Resolute, Hamburg, 25 cs.
Quality Art Novelty Co., Milwaukee, Hamburg, 33 bls.

BARYTA COATED PAPER

Globe Shipping Co., Dresden, Bremen, 341 cs.
Globe Shipping Co., Berlin, Bremen, 73 cs.

ALUMINUM PAPER

Catty Foil Co., Berlin, Bremen, 14 cs.
Catty Foil Co., Pres. Harding, Bremen, 40 cs.

SILK PAPER

Globe Shipping Co., Berlin, Bremen, 2 bls.

GOLD COATED PAPER

F. Murray Hill Co., Berlin, Bremen, 10 cs.
F. Murray Hill Co., Bremen, Bremen, 1 cs.

COATED PAPER

W. A. Foster & Co., Berengaria, Southampton, 3 cs.

CAOUTCHOUC PAPER

American Express Co., Resolute, Hamburg, 8 cs.

TRANSPARENT GREASEPROOF PAPER

Central Hanover Bank & Trust Co., Resolute, Hamburg, 22 cs.
Central Hanover Bank & Trust Co., Milwaukee, Hamburg, 105 cs.

CARD BOARD

American Express Co., Milwaukee, Hamburg, 105 cs.

STENCIL PAPER

International Forwarding Co., Milwaukee, Hamburg, 5 cs.

GALLIC PAPER

Keuffel & Esser Co., Carmania, Southampton, 2 cs.

WAX COATED PAPER

Supertype Stencil Co., Dresden, Bremen, 6 cs.

ENVELOPES

J. Beckhardt, Dresden, Bremen, 37 cs.
Globe Shipping Co., Bremen, Bremen, 50 cs.

BASIC PAPER

Globe Shipping Co., Dresden, Bremen, 2 cs.

PAPER AND PHOTO PLATES

Gevaert Co. of America, E. Francqui, Antwerp, 210 cs.

MISCELLANEOUS PAPER

Arkell Safety Bag Co., City of Fairbury, Gothenburg, 442 rolls.
The Borregaard Co., Inc., City of Fairbury, Gothenburg, 263 bales, 1,357 rolls.
C. G. Winans Co., City of Fairbury, Gothenburg, 608 rolls, 32 bls.
Crepe Kraft Co., City of Fairbury, Gothenburg, 55 rolls, 5 bls.
C. J. O'Shea, City of Fairbury, Gothenburg, 24 rolls.
Chatfield Paper Works, City of Fairbury, Gothenburg, 22 bls.
B. Ullmann Co., City of Fairbury, Gothenburg, 21 bls.
Steffens Jones Co., Calcutta Maru, Kobe, 2 cs.
Keuffel & Esser Co., Volendam, Rotterdam, 9 cs.
Globe Shipping Co., Majestic, Southampton, 4 cs.
F. C. Teipel, Coahoma County, Rotterdam, 7 bls.
Titan Shipping Co., De Grasse, Havre, 3 cs.
Standard Products Corp., De Grasse, Havre, 59 cs.
P. J. Schweitzer, De Grasse, Havre, 15 cs.
J. W. Hampton, Jr., Inc., De Grasse, Havre, 5 cs.
R. F. Downing & Co., De Grasse, Havre, 7 cs.
Keller Dorian Paper Co., De Grasse, Havre, 44 cs.

RAGS, BAGGINGS, ETC.

Baring Bros. & Co., Birk, Alexandria, 223 bls. rags.
W. Schall & Co., Birk, Alexandria, 179 bls. rags.
Kidder Peabody Accep. Corp., Birk, Alexandria, 54 bls. rags.
Irving Trust Co., Birk, Alexandria, 130 bls. rags.
Amsinck, Sonne & Co., Inc., Birk, Alexandria, 216 bls. rags.
Fidelity Trust Co., Schodack, Bordeaux, 204 bls. paper pulp.
Cohen & Son, Schodack, Bordeaux, 67 bls. rags.
B. D. Kaplan, Schodack, Bordeaux, 3 bls. rags.
Fidelity Trust Co., Exiria, Valencia, 31 bls. rags.
Darmstadt, Scott & Courtney, P. Henry, ——, 75 bls. rags.
Darmstadt, Scott & Courtney, P. Henry, ——, 50 bls. wipers.
Fidelity Trust Co., Excelsior, Bari, 87 bls. rags.
V. Galaup, Excelsior, Bari, 114 bls. rags.
Kidder Peabody Accep. Corp., Excelsior, Marseilles, 107 bls. rags.
V. Galaup, Excelsior, Marseilles, 27 bls. rags.
V. Galaup, MacKeesport, Havre, 60 bls. rags.
J. Cohen & Son, MacKeesport, Havre, 132 bls. rags.
B. D. Kaplan, MacKeesport, Havre, 70 bls. rags.
Castle & Overton, Inc., MacKeesport, Havre, 76 bls. rags.
French American Banking Corp., Rigel, Palermo, 103 bls. rags.
C. B. Richard & Co., Estonia, Danzig, 499 bls. rags.
Fidelity Trust Co., Timavo, Bari, 78 bls. rags.
A. W. Fenton, Inc., America, Bremen, 245 bls. rags.
Kidder Peabody Accep. Corp., America, Bremen, 57 bls. rags.
Irving Trust Co., Milwaukee, Hamburg, 40 bls. cotton waste.
W. Schall & Co., Milwaukee, Hamburg, 5 bls. rags.
Castle & Overton, Inc., Milwaukee, Hamburg, 8 bls. rags.
Chemical Bank & Trust Co., Milwaukee, Hamburg, 10 bls. rags.
G. W. Millar & Co., Volendam, Rotterdam, 147 bls. rags.
Manufacturers Trust Co., Extavia, Oran, 326 bls. rags.
Banco Com'l Trust Co., Extavia, Genoa, 256 bls. bagging.
Castle & Overton, Inc., Extavia, Greece, 62 bls. bagging.
D. M. Hicks, Inc., Francisco, Antwerp, 300 bls. flax waste.
Overton & Co., Francisco, Antwerp, 398 bls. bagging.
Katzenstein & Keene, Inc., Francisco, Antwerp, 81 bls. rags.
D. M. Hicks, Inc., Francisco, Antwerp, 141 bls. paper waste.
D. M. Hicks, Inc., E. Francqui, Antwerp, 215 bls. flax pulp.
E. Mayer, Coahoma County, Rotterdam, 20 bls. rags.
Overton & Co., Coahoma County, Rotterdam, 161 bls. bagging.
E. J. Keller Co., Inc., Coahoma County, ——, 66 bls. rags.
Albany Fibre Co., Anaconda, Antwerp, 6 bls. rags.
Mercer Braided Stock Co., Anaconda, Antwerp, 15 bls. rags.
W. Loewenthal & Co., Anaconda, Antwerp, 14 bls. rags.
E. Mayer, Anaconda, Antwerp, 8 bls. rags.
Cohen & Son, Vincent, Dunkirk, 145 bls. rags.
Darmstadt, Scott & Courtney, Vincent, Havre, 48 bls. rags.
D. M. Hicks, Inc., Vincent, Havre, 109 bls. rags.
Central Hanover Bank & Trust Co., Dresden, Bremen, 35 bls. linen threads.
Castle & Overton, Inc., Minnewaska, London, 73 bls. rags.
Castle & Overton, Inc., Thuringia, Hamburg, 39 bls. rags.

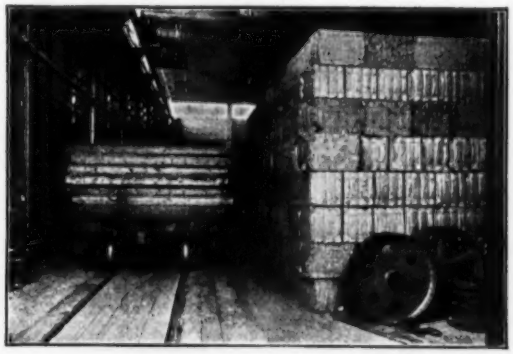
(Continued on page 148)

FIDALGO DRYING SYSTEMS

PATENTS GRANTED AND PENDING IN ALL COUNTRIES

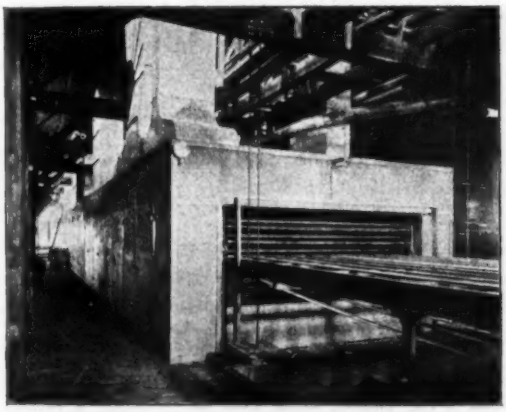
INVESTIGATE OUR INSTALLATIONS

FOR PULP DRYING



SHREDDED PULP DRIED WITH SAME STRENGTH AS WET

FOR INSULATING BOARD



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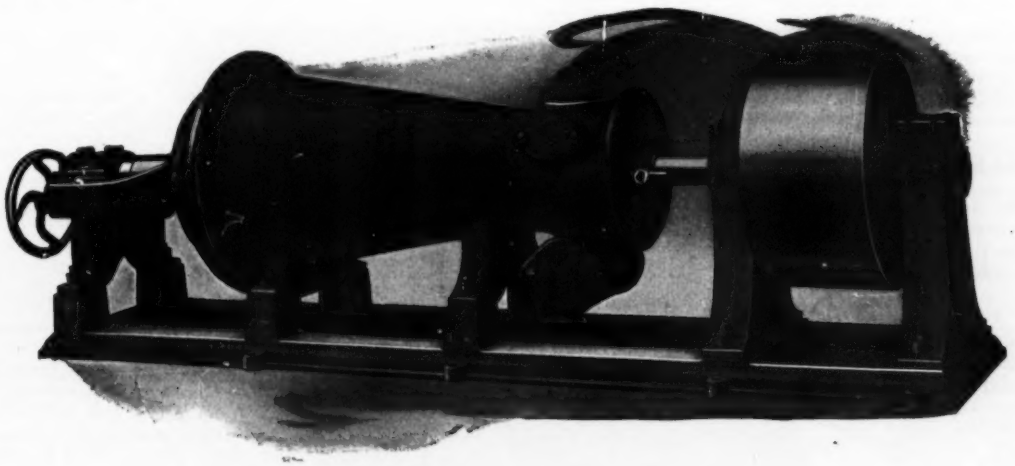
CHANIN BUILDING NEW YORK

OVER ONE HUNDRED YEARS OF SUCCESS IN DESIGNING AND BUILDING MACHINERY FOR MAKING FINEST GRADES OF PAPER IS A RECORD WARRANTING YOUR CONSIDERATION WHEN DECIDING ON NEW EQUIPMENT.



OUR NO. 60 JORDAN ENGINE

THE SMITH & WINCHESTER MFG. CO.,

SOUTH WINDHAM, CONN.

Imports of Paper and Paper Stock

(Continued from page 146)

Castle & Overton, Inc., United States, Copenhagen, 54 bls. jute.
Castle & Overton, Inc., Lepanto, Antwerp, 163 bls. bagging.
Castle & Overton, Inc., Lepanto, Antwerp, 132 bls. rags.
E. J. Keller Co., Inc., London Corporation, ——, 10 bls. linen threads.
E. J. Keller Co., Inc., Chile Maru, ——, 4 bls. linen cuttings.

OLD ROPE

N. E. Berzen, Excelsior, Marseilles, 60 coils.
Brown Bros. & Co., Dresden, Bremen, 54 coils.
Chemical Bank & Trust Co., Dresden, Bremen, 99 bales.
International Purchasing Co., Volendam, Rotterdam, 42 coils, 46 bales.
International Purchasing Co., Vincent, Dunkirk, 62 coils.
W. Steck & Co., Francisco, Hull, 64 coils.
Brown Bros. & Co., E. Francqui, Antwerp, 48 coils.

CASEIN

A. Hurst & Co., Volendam, Rotterdam, 200 bags.
A. Hurst & Co., De Grasse, Havre, 267 bags.
Atterbury Bros., Inc., Pan America, Buenos Aires, 834 bags.
Kalbfleisch Corp., Pan America, Buenos Aires, 584 bags.

WOOD PULP

G. S. Kerr Co., Ltd., Anders, St. Albans, 781 cords wood pulp.
J. Andersen & Co., Tilthorn, Stugsund, 1,000 bls. sulphite.
J. Andersen & Co., Tilthorn, Svano, 5,940 bls. sulphite.
J. Andersen & Co., Tilthorn, Spraengsviken, 6,750 bls. sulphate.
Pagel, Horton & Co., Inc., Tilthorn, Munksund, 1,200 bls. sulphite.
Bulkley, Dunton & Co., Tilthorn, ——, 7,154 bls. wood pulp.
J. Andersen & Co., C. of Fairbury, Sarpsborg, 1,350 bls. sulphite.
Lagerloef Trading Co., Minnequa, Raumo, 640 bls. wood pulp, 105 tons.
Castle & Overton, Inc., Thuringia, Hamburg, 701 bls. wood pulp, 105 tons.
Castle & Overton, Inc., Rheinland, Germany, 1,048 bls. wood pulp.

WOOD FLOUR

The Burnet Co., Coahoma County, Rotterdam, 250 bags, 10,000 kilos.

WOOD PULP WADDING

Birn & Wachenheim, Volendam, Rotterdam, 50 bls.

NORFOLK IMPORTS

WEEK ENDING OCTOBER 26, 1929

New York Trust Co., Anaconda, Antwerp, 24 bls. bagging.
E. Butterworth & Co., Inc., Anaconda, Antwerp, 69 bls. bagging.
Darmstadt, Scott & Courtney, Anaconda, Antwerp, 295 bls. bagging.
Castle & Overton, Inc., Eifel, Germany, 888 bls. wood pulp.

CHARLESTON IMPORTS

WEEK ENDING OCTOBER 26, 1929

Castle & Overton, Inc., Liberty Glo, England, 85 bls. bagging.

NEW ORLEANS IMPORTS

WEEK ENDING OCTOBER 26, 1929

Castle & Overton, Inc., Gand, Belgium, 268 bls. rags.

PHILADELPHIA IMPORTS

WEEK ENDING OCTOBER 26, 1929

A. W. Fenton, Inc., Schodack, Bordeaux, 104 bls. rags.
National City Bank, Schodack, Bordeaux, 755 bls. rags.
Philadelphia Natl. Bank, Schodack, Bordeaux, 103 bls. rags.
J. A. Steer & Co., Schodack, Bordeaux, 26 bls. rags.
D. I. Murphy, Schodack, Bordeaux, 46 bls. rags.
Katzenstein & Keene, Inc., Schodack, Bordeaux, 54 bls. rags.
Katzenstein & Keene, Inc., Schodack, St. Nazaire, 218 bls. rags.
H. G. Lichtenstein, Schodack, St. Nazaire, 453 bls. rags.
D. I. Murphy, Schodack, St. Nazaire, 27 bls. rags.
P. Berlowitz, Schodack, St. Nazaire, 447 bls. rags.
V. Galaup, Schodack, St. Nazaire, 45 bls. rags.
Fidelity Trust Co., Exiria, Valencia, 35 bls., rags.
Liberty National Bank, Excelsior, Marseilles, 115 bls. rags.
Delaware Hard Fibre Co., MacKeesport, Dunkirk, 17 bls. rags.
Union Waste Co., MacKeesport, Dunkirk, 20 bls. rags.
D. I. Murphy, MacKeesport, Dunkirk, 56 bls. rags.
E. L. Moerman, MacKeesport, Dunkirk, 46 bls. rags.
J. M. Hagy Waste Works, MacKeesport, Dunkirk, 106 bls. rags.
Katzenstein & Keene, Inc., MacKeesport, Dunkirk, 217 bls. rags, 106 bls. bagging.
Belgam Corp., MacKeesport, Havre, 32 bls. rags.
A. Hurst & Co., MacKeesport, Havre, 81 bls. rags.
J. A. Steer & Co., MacKeesport, Havre, 176 bls. rags.
Katzenstein & Keene, Inc., MacKeesport, Havre, 27 bls. rags.
V. Galaup, MacKeesport, Havre, 111 bls. rags.
D. I. Murphy, MacKeesport, Havre, 317 bls. rags, 69 bls. bagging.
Delaware Hard Fibre Co., MacKeesport, Havre, 74 bls. rags.
S. E. Ingber, MacKeesport, Havre, 167 bls. rags.
Castle & Overton, Inc., MacKeesport, Havre, 54 bls. rags.
W. J. Jones Co., MacKeesport, Havre, 3 cs. wall paper.
National City Bank, Rigel, Palermo, 394 bls. rags.
Banco Com'l Italiane Trust Co., Rigel, Naples, 59 bls. rags.
The Borregaard Co., Inc., City of Fairbury, Hurum, 1,228 bls. sulphate.
The Borregaard Co., Inc., City of Fairbury, Bamble, 600 bls. sulphate, 100 tons.
Guaranty Trust Co., Timavo, Venice, 60 bls. rags.
National City Bank, Timavo, Bari, 118 bls. rags.
Fidelity Trust Co., Timavo, Bari, 124 bls. rags.
F. Weber & Co., Extavia, Genoa, 28 cs. paper.
National City Bank, Extavia, Piraeus, 52 bls. rags.
Neidich Process Co., Minnequa, Helsingfors, 88 cs. tissue paper.
——, Minnequa, Kemi, 4,075 bls. wood pulp, 680 tons.
Pagel, Horton & Co., Inc., Minnequa, Husum, 5,400 bls. sulphate, 900 tons.
Lagerloef Trading Co., Minnequa, Raumo, 315 bls. sulphite, 53 tons.
E. J. Keller Co., Inc., Burgerdyk, ——, 127 bls. rags.
E. J. Keller Co., Inc., Nordvard, ——, 49 bls. new cuttings.
E. J. Keller Co., Inc., Sarcoxie, ——, 42 bls. new rags.
E. J. Keller Co., Inc., Rheinland, ——, 350 bls. wood pulp.
Castle & Overton, Inc., Capulin, Scotland, 185 bls. rags.
Castle & Overton, Inc., Exeter City, England, 100 bls. rags.
Castle & Overton, Inc., Hinnoy, Spain, 421 bls. rags.
Castle & Overton, Inc., Bellepline, Holland, 113 bls. rags.
Castle & Overton, Inc., Hagen, Germany, 56 bls. rags.

BALTIMORE IMPORTS

WEEK ENDING OCTOBER 26, 1929

Baltimore Trust Co., Schodack, Bordeaux, 40 bls. rags.
Castle & Overton, Inc., Schodack, Bordeaux, 232 bls. rags.
Katzenstein & Keene, Inc., Schodack, Bordeaux, 55 bls. rags.
Congoleum Nairn Co., Schodack, Bordeaux, 374 bls. rags.
Congoleum Nairn Co., Schodack, St. Nazaire, 282 bls. rags.
Katzenstein & Keene, Inc., Schodack, St. Nazaire, 126 bls. rags.
Pagel, Horton & Co., Inc., Tilthorn, Munksund, 4,500 bls. sulphate.
Pagel, Horton & Co., Inc., Tilthorn, Svano, 3,000 bls. chemical pulp.
Pagel, Horton & Co., Inc., Tilthorn, Svano, 2,250 bls. sulphite.
J. Andersen & Co., Tilthorn, Spraengsviken, 750 bls. sulphate.
Irving Trust Co., Tilthorn, Sandviken, 1,500 bls. sulphate.
Bulkley, Dunton & Co., Tilthorn, ——, 1,800 bls. wood pulp.
National City Bank, Nippon, Venice, 424 bls. rags.
National City Bank, Nippon, Trieste, 272 bls. rags.
Baltimore Trust Co., Calcutta Maru, Kobe, 155 bls. rags.
National City Bank, Extavia, Piraeus, 258 bls. rags.
Congoleum Nairn Co., Anaconda, Antwerp, 1,565 bls. rags.
Scher Bros. Co., Anaconda, Antwerp, 58 bls. rags.
Katzenstein & Keene, Inc., Vincent, Dunkirk, 767 bls. rags.
S. Shapiro, Vincent, Dunkirk, 104 bls. rags.
Congoleum Nairn Co., Vincent, Dunkirk, 191 bls. rags.
Congoleum Nairn Co., Vincent, Havre, 458 bls. rags.
Castle & Overton, Inc., Vincent, Havre, 18 bls. rags.
Katzenstein & Keene, Inc., Vincent, Havre, 99 bls. rags.
Kalbfleisch Corp., Vincent, Havre, 205 bags casein.
A. Hurst & Co., Vincent, Havre, 664 bags casein.
Castle & Overton, Inc., Eifel, Germany, 3,337 bls. wood pulp.

BOSTON IMPORTS

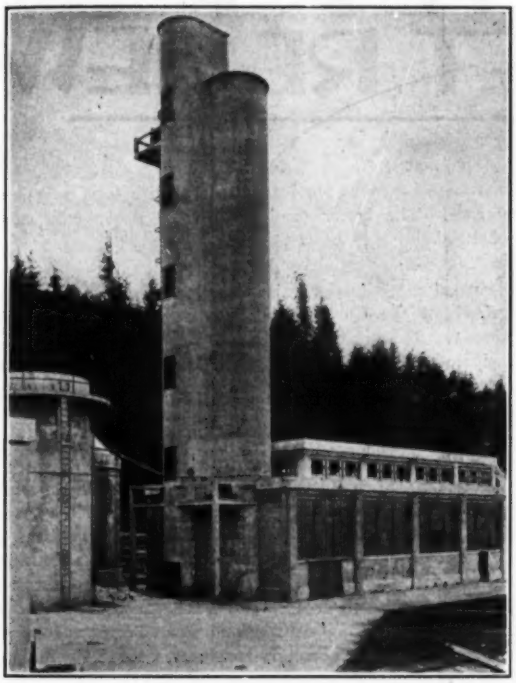
WEEK ENDING OCTOBER 26, 1929

Pagel, Horton & Co., Inc., City of Fairbury, Domsjo, 3,000 bls. sulphite, 500 tons.
Perkins, Goodwin & Co., City of Fairbury, Obbola, 4,900 bls. sulphate, 700 tons.
J. Andersen & Co., City of Fairbury, Gothenburg, 2,375 bls. sulphite, 481 tons.
Price & Pierce, Ltd., City of Fairbury, Gothenburg, 500 bls. wood pulp, 101 tons.
J. Andersen & Co., City of Fairbury, Sarpsborg, 1,968 bls. wood pulp, 228 tons.
The Borregaard Co., Inc., City of Fairbury, Hurum, 672 bls. sulphate, 112 tons.
The Borregaard Co., Inc., City of Fairbury, Bamble, 300 bls. sulphate, 50 tons.
M. Gottesman & Co., Inc., Timavo, Sebenico, 4,000 bls. wood pulp.
J. Andersen & Co., Timavo, Trieste, 1,050 bls. wood pulp.
Brown Bros. & Co., Francisco, Hull, 297 coils old rope, 134 bls. yarn.
Campbell Ward Co., Francisco, Antwerp, 12 bls. thread waste.
Stone, Forsythe Co., Ltd., Francisco, Antwerp, 50 bls. bagging.
Spaulding Fibre Co., Francisco, Antwerp, 1,091 bls. flax waste.
Webster Atlas Natl. Bank, Francisco, Antwerp, 214 bls. flax waste.
American Felt Co., Francisco, Antwerp, 46 bls. flax waste.
Irving Trust Co., Nitonian, Manchester, 23 bls. rags.
Baring Bros. & Co., Nitonian, Manchester, 38 bls. rags.
E. Butterworth & Co., Inc., Nitonian, Manchester, 139 bls. rags, 62 bags wipers.
E. J. Keller Co., Inc., Burgerdyk, ——, 125 bls. rags.
E. J. Keller Co., Inc., Harburg, ——, 52 bls. rags.
E. J. Keller Co., Inc., Bellepline, ——, 75 bls. rags.
Castle & Overton, Inc., Bellepline, Holland, 35 bls. rags.
Castle & Overton, Inc., ——, Germany, 187 bls. wood pulp.

PORTLAND IMPORTS

WEEK ENDING OCTOBER 26, 1929

Lagerloef Trading Co., City of Fairbury, Helsingfors, 1,500 bls. wood pulp, 227 tons.
Waterfalls Papermills Co., City of Fairbury, Gothenburg, 4,250 bls. wood pulp, 862 tons.
The Borregaard Co., Inc., City of Fairbury, Gothenburg, 1,750 bls. wood pulp, 355 tons.
The Borregaard Co., Inc., City of Fairbury, Sarpsborg, 1,800 bls. sulphate, 300 tons.
The Borregaard Co., Inc., City of Fairbury, Hurum, 2,000 bls. sulphate.
The Borregaard Co., Inc., City of Fairbury, Bamble, 672 bls. sulphate, 112 tons.
Lagerloef Trading Co., Minnequa, Helsingfors, 680 bls. sulphite, 102 tons.
——, Minnequa, Kemi, 10,660 bls. wood pulp, 1,780 tons.



123
Jenssen Two Tower Acid Systems

Now in Operation or Building - -

Jenssen Spray Type Cooler
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Kamyr Pulp Presses
Strindlund Relief Cooler
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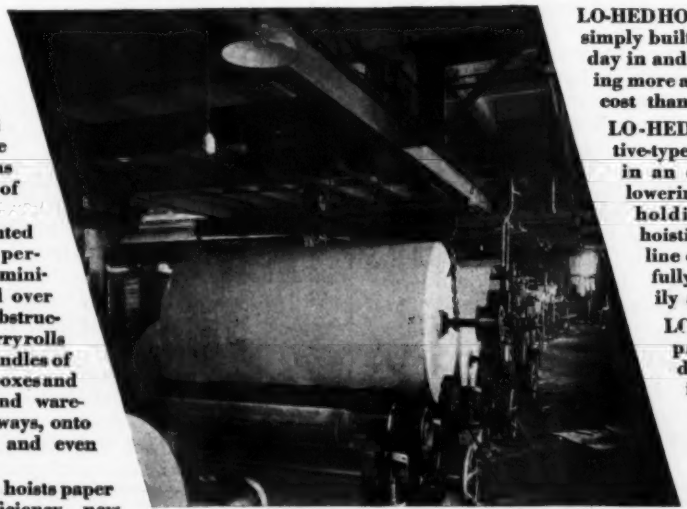
Saving Money for the Paper Industry
LO-HED HOISTS

LO-HED ELECTRIC HOISTS . . . fast . . . powerful . . . for lifting and carrying all kinds of burdens, are saving and making money for the Paper Industry, just as they are for scores of other industries.

Because of the patented LO-HED features, permitting operation in minimum headroom and over floors crowded with obstructions, this hoist can carry rolls and cases of paper, bundles of bulky raw materials, boxes and crates, in factory and warehouse, through doorways, onto shipping platforms and even into box-cars.

With the aid of these hoists paper plants find new efficiency, new economies and greater prosperity.



¼-TON TO 12-TON CAPACITIES

LO-HED HOISTS are strongly and simply built for untiring service day in and day out, accomplishing more and better work at less cost than many men can do.

LO-HED has rugged automotive-type spur gears operating in an oil bath, automatic lowering brake, dependable holding brake, special hoisting cable and hair-line control. All parts are fully enclosed, but readily accessible.

LO-HED HOISTS simplify material handling, reduce costs, increase production and boost profits.

No matter what YOUR business is, LO-HED can make money for YOU.

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In Canada, Affiliated Engineering Companies, Ltd., Southam Bldg., Montreal

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, October 30, 1929.

Conditions in the local paper market continue satisfactory. Practically all the various grades of paper are in good demand. Ground wood specialties are particularly strong at present, the movement to consumption being unusually heavy. Sales forces of the leading paper organizations are booking a good volume of orders for future and immediate delivery. Prices are generally holding to schedule.

The news print market is exhibiting a strong undertone. Production at the North American mills is running at approximately 86 per cent of capacity. Shipments are moving at about 90 per cent of rating. Stocks in the hands of the publishers are lower than for some time past. With the price situation stabilized, the outlook for the news print industry is decidedly promising.

Demand for the various grades of paper board is persistent but the price situation is still unsatisfactory. The fine paper market is in a sound position with prices holding to previously quoted levels. Tissues are going forward in seasonal volume. Some improvement was noticed in the coarse paper market and wrapping paper is moving at an excellent pace.

Mechanical Pulp

Production of ground wood both in this country and abroad is below normal and offerings are rather limited. Most of the business transacted of late has been along routine lines. Shipments against contract have been normal for the season. Prices are generally steady and unchanged and there is little talk of concessions around at present.

Chemical Pulp

Trading in the chemical pulp market was moderately active during the past week. However, the industry is in a sound position and both domestic and foreign producers are well sold ahead. Strong unbleached and easy bleaching grades of sulphite pulp continue exceptionally firm. While demand for bleached sulphite has fallen off slightly, prices generally remain steady.

Old Rope and Bagging

Steadiness continues to prevail in the old rope market. Both domestic and imported old manila rope are in satisfactory request. Mixed rope is fairly steady. Prices are holding to previously quoted levels. The bagging market is practically unchanged. No. 1 scrap bagging is going forward to the tissue mills at a seasonal pace. Roofing bagging is moderately active.

Rags

Paper mill interest in the domestic rag market is showing some signs of improvement although the prevailing demand is light. Cotton cuttings are moving into consumption in fair volume. Spot offerings, however, are limited. Roofing rags are in slightly better request. Mixed rags are fairly steady. There are some inquiries around for foreign rags although business at present is rather quiet.

Waste Paper

The board mills are still displaying little interest in the lower grades of paper stock which are unusually weak for the time of year. Stocks in the hands of the mills are reported to be not excessive and the situation should improve considerably when the board manufacturers are forced to replenish their supplies of raw materials. The better grades of waste paper rule steady and unchanged.

Twine

Seasonal conditions prevail in the local twine market. With the approach of the Christmas holiday season the demand for the various varieties is expanding and an exceptionally busy time is anticipated during the closing months of the year. The movement into consumption is already improving. Prices are generally holding to schedule and shading is infrequent.

Michigan Superintendents Elect Officers

KALAMAZOO, Mich., October 21, 1929.—The Michigan Division of the American Pulp and Paper Mill Superintendents Association at its Thursday evening annual election, named William Siewert, of the Michigan Carton Company, Battle Creek, as chairman. He succeeds Michael J. Redmond, of the Kalamazoo Paper Company. Other officers elected are: First vice chairman, Walter Crawford, Sutherland Paper Company; second vice chairman, John Weimer, Lee Paper Company; secretary-treasurer, George Pountain, Bryant Paper Company.

The meeting was held at the Park-American hotel. L. H. Rooney, of the Matieson Paper Company, Chicago, talked on "Slime in Paper Mills."

Boston Paper Market Steady

BOSTON, Mass., October 28, 1929.—The condition of the Boston paper market is steady. Many of the dealers report a good business with a strong demand for bonds and ledgers. The coarse paper market is stable with at least an average demand. One dealer states that October has been the heaviest month of the year, so far.

The box board market continues fair, although the price situation is deplorable. Values are unchanged from those of a week ago.

In paper stock the situation is practically the same. The market is fairly steady, but business "is not rushing."

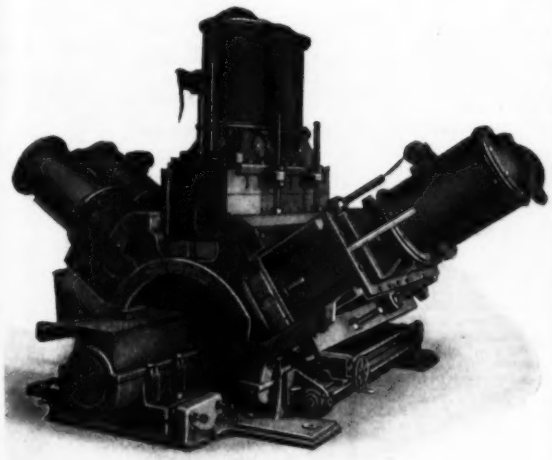
Swedish Pulp and Paper Prices Unchanged

WASHINGTON, D. C., October 30, 1929.—With the exception of a decrease in the minimum price quoted on bleached sulphite pulp, Swedish pulp and paper prices remained unchanged during the last half of September.

The new machines that are being installed in the sulphate mill owned by Aktiebolaget Munksund, Lulea, Sweden, will increase the capacity of the plant from 30,000 to 42,000 metric tons annually. This company, which was a subsidiary of the Aktiebolaget Ytterstfors-Munksund, was reestablished in 1926.

Let Contract For Six Biggs Digesters

The Biggs Boiler Works Company, Akron, Ohio, has recently received contract from the Fir Tex Insulating Board Company for six Biggs 18 foot diameter Rotary Digesters to be delivered and erected at the Fir Tex Insulating Board Company plant at St. Helens, Ore. Work on the fabricating of the rotaries is being rushed in the Biggs plant and the erecting department is expected to soon have the digesters in the course of erection.



International Grinders

Curtis Patent for 4-ft. Wood

Mills using Magazine Grinders and with power available are finding a quick and relatively inexpensive way to increase groundwood production by hooking one of these Grinders to each existing line.

Built in two stone sizes, 60" x 54" and 54" x 54".

Normal output 15 to 18 tons.

Full particulars on request.

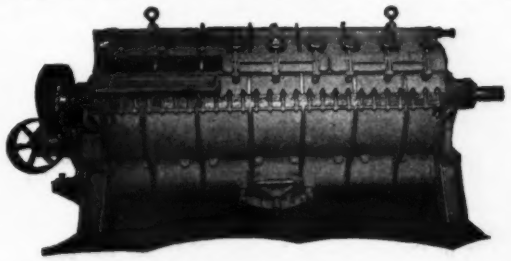
Montague Machine Co.

TURNERS FALLS, MASS.

PULP RECOVERY

from black liquors at least 3½ pounds per thousand gallons, by the use of

VALLEZ
ROTATING LEAF FILTERS



Evaporator capacity is increased. Maintenance and labor costs are kept down. Green liquors are cleared of ash and other impurities. Lime is removed and reclaimed from the white liquor.

Vallez Filters give 100% efficiency in the removal of solids on a single filtration. Rotation of the filter leaves makes possible utilization of entire filtering surface to maximum capacity. Sluicing off is accomplished thoroughly within the filter. It is never necessary to remove the leaves for washing, or to open the filter during operation.

J. & G. HEAVY DUTY ROTARY VACUUM FILTERS

Continuous in operation and require a minimum of supervision. Self-discharging; self-cleaning; work automatically. Have high capacity on lime sludges and white waters. Also used as washers and thickeners.

J. & G. Quadruple Effect EVAPORATORS and CONCENTRATORS

Especially designed to give high capacity and concentration on black liquors.

Our engineering department will gladly submit recommendations, complete equipment data and estimates to meet your specific problems. Write for catalog.

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Main Office and Works: **Birmingham, Ala.**
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Cable Address: "JOUGOS"—Western Union Code—5 letter

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, October 30, 1929.

BLANC FIXE.—The blanc fixe market is practically unchanged. Both the pulp and the powder are in seasonal demand. Prices are steady and unaltered. The pulp is quoted at from $42.50 to $45.00 per ton, in bulk, while the powder is selling at from 3¾ cents to 4½ cents per pound, in barrels, at works.

BLEACHING POWDER.—Trading in the bleaching powder market was moderately active. The contract movement is about normal for the time of year. Prices are generally holding to schedule without difficulty. Bleaching powder is quoted at from $2.00 to $2.35 per 100 pounds, in large drums, at works.

CASEIN.—No radical changes were reported in the casein market. Domestic casein is quoted at from 15½ cents to 16¾ cents per pound. Argentine standard ground is selling at from 16 cents to 16¼ cents, and finely ground at from 16½ cents to 17 cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Steadiness prevails in the caustic soda market. Shipments against contract are moving in good volume. Prices are holding to schedule. Solid caustic soda is quoted at from $2.90 to $2.95, and the flake and the ground at from $3.30 to $3.35 per 100 pounds, in large drums, at works.

CHINA CLAY—Conditions in the china clay market are fairly satisfactory. The contract movement is well up to average. Prices are steady. Imported china clay is still quoted at from $15 to $25 per ton, ship side, while domestic paper making clay is selling at from $8 to $13 per ton, at mine.

CHLORINE.—Some chlorine producers announce a reduction of 15 cents in their tank car basis to $2.85 per 100 pounds for 1930 contracts. No change has been reported on the schedule for cylinders. It is anticipated that a considerable volume of business will be booked during the next few weeks.

ROSIN.—The rosin market fluctuated slightly. Demand was fairly active. The grades of gum rosin used in the paper mills are now quoted at around $9.30 per 280 pounds, in barrels, on dock. Wood rosin is still selling at from $7.00 to $8.05 per 280 pounds, in barrels, at southern shipping points.

SALT CAKE.—Offerings of salt cake continue very scarce and the market is exhibiting a strong undertone. Contract shipments are being called for in heavy volume. Salt cake is quoted at from $18 to $21 per ton, while chrome salt cake is selling at from $15 to $16 per ton, in bulk, at works.

SODA ASH.—Production of soda ash is being maintained in sufficient volume to take care of current requirements. Prices are generally holding to previously quoted levels without difficulty. Contract quotations on soda ash, in car lots, at works, are as follows: in bags, $1.32½, and in barrels, $1.55.

STARCH.—The starch market is in a sound position. Supplies are moving to the paper mills in satisfactory volume. Prices are holding to schedule, and there is little talk of concessions. Special paper making starch is quoted at $3.92 per 100 pounds, in bags, and at $4.19 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—Demand for sulphate of alumina from the paper mills is fairly persistent. Shipments against contract are proceeding at a steady pace. Prices remain unchanged. Commercial grades are quoted at $1.40 to $1.55 and iron free at $1.90 to $2.05 per 100 pounds, in bags ,at works.

SULPHUR.—The undertone of the sulphur market is strong. Prices remain unchanged. Sulphur is quoted at $18 per ton, at mine, in lots of 1,000 tons, or over, on yearly contracts, and $20 per ton for any smaller quantity over that period. On spot and near by car loads, the quotation is $21 per ton.

TALC.—Most of the business transacted in the talc market during the past week was along routine lines. Prices continue steady and unchanged. Domestic talc is quoted at from $16 to $18 per ton, in bulk, at eastern mines, while imported talc is selling at from $18 to $20 per ton, in bags, ship side.

Market Quotations

Paper
(F. o. b. Mill)

Ledgers	11.00	@38.00
Bonds	9.00	@53.25
Writings—		
Extra Superfine	14.00	@32.00
Superfine	14.00	@32.00
Tub sized	10.00	@15.00
Engine sized	8.00	@11.00
Book, Cased—		
S. & S. C.	6.00	@ 7.50
M. F.	5.75	@ 7.00
Coated and Enamel	7.50	@12.00
Lithograph	7.50	@12.00
Tissues—Per Ream—		
White No. 1	.75	@ 1.00
Anti-Tarnish	1.35	@ 1.90
Colored	1.00	@ 2.00
White No. 2	.75	@ .80
Kraft	1.00	@ 1.10
Manila	.75	@ .80
Kraft—		
No. 1 Domestic	6.25	@ 6.50
No. 2 Domestic	5.25	@ 5.50
Southern	4.25	@ 4.50
Imported	6.50	@ 7.00
Manila—		
No. 1 Jute	9.00	@ 9.25
No. 2 Jute	7.75	@ 8.50
No. 1 Wood	4.75	@ 5.25
No. 2 Wood	4.00	@ 4.50
Butchers	3.75	@ 4.25
Fibre Papers—		
No. 1 Fibre	5.00	@ 5.50
No. 2 Fibre	4.75	@ 5.25
Common Bogus	2.75	@ 3.00
Screenings	3.00	@ 3.25
Card Middles	4.00	@ 5.00
Glassine—		
Bleached, basis 25 lbs.	13.00	@16.00
Bleached, basis 20 lbs.	15.00	@16.00

(Delivered New York)

News, per ton—		
Rolls, contract	62.00	@ —
Rolls, spot	62.00	@ —
Sheets	67.00	@ —
Side Runs	47.00	@52.00
Boards—per ton—		
News	37.50	@40.00
Straw	52.50	@55.00
Chip	35.00	@37.50
Binders' Boards	65.00	@70.00
Wood Pulp	80.00	@85.00
65 Test Jute Liner	52.50	@ —
85 Test Jute Liner	55.00	@ —
Sgl. Mla. Ll. Chip	47.50	@50.00

Mechanical Pulp
(On Dock)

No. 1 Imported—		
Moist	30.00	@32.00
Dry	32.00	@34.00

(F. o. b. Mill)

No. 1 Domestic	26.00	@30.00
Screenings	15.00	@20.00

Chemical Pulp
(On Dock. Atlantic Ports)

Sulphite (Imported)—		
Bleached	3.75	@ 4.25
Easy Bleaching	3.00	@ 3.15
No. 1 strong unbleached	2.75	@ 3.00
Mitscherlich unbleached	2.80	@ 3.25
No. 2 strong unbleached	2.40	@ 2.60
No. 1 Kraft	2.35	@ 2.65
No. 2 Kraft	2.30	@ 2.50
Sulphate—		
Bleached	3.60	@ 3.85

(F. o. b. Pulp Mill)

Sulphite (Domestic)—		
Bleached	3.40	@ 4.75
Easy Bleaching Sulphite	2.65	@ 3.00
News Sulphite	2.50	@ 2.70
Mitscherlich	3.00	@ 3.25
Kraft (Domestic)	2.10	@ 3.30
Soda Bleached	3.10	@ 3.25
Sulphate Screenings—		
Coarse	.75	@ .95
Refined	1.65	@ 1.85

Domestic Rags
New Rags
(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—		
New White, No. 1	11.00	@11.50
New White, No. 2	8.00	@ 8.50
Silesias No. 1	7.50	@ 8.00
New Unbleached	11.00	@11.50
New Blue Prints	5.25	@ 5.50
New Soft Blacks	5.25	@ 5.75
Blue Overall	7.50	@ 8.00
Washables	4.75	@ 5.25
Fancy	5.75	@ 6.25
Mixed Khaki Cuttings	4.75	@ 5.25
Pink Corset Cuttings	8.00	@ 8.50
O. D. Khaki Cuttings	5.15	@ 5.75
Men's Corduroy	3.75	@ 4.25
New Mixed Blacks	3.50	@ 3.75

Old Rags

White, No. 1—		
Repacked	5.50	@ 6.00
Miscellaneous	4.50	@ 5.00
White, No. 2—		
Repacked	3.00	@ 3.50
Miscellaneous	2.50	@ 2.75
St. Soiled, White	2.00	@ 2.15
Thirds and Blues—		
Repacked	2.25	@ 2.50
Miscellaneous	1.75	@ 2.00
Black Stockings	3.25	@ 3.75
Roofing Rags—		
Cloth Strippings	1.70	@ 1.80
No. 1	1.70	@ 1.80
No. 2	1.55	@ 1.65
No. 3	1.30	@ 1.40
No. 4	1.25	@ 1.35
No. 5A	.90	@ 1.05

Foreign Rags
New Rags

New Dark Cuttings	2.50	@ 3.00
New Mixed Cuttings	2.75	@ 3.25
New Light Silesias	7.00	@ 7.50
Light Flannelettes	7.50	@ 8.00
Unbleached Cuttings	10.00	@11.00
New White Cuttings	10.50	@11.50
New Light Oxfords	7.00	@ 7.50
New Light Prints	5.50	@ 6.50

Old Rags

No. 1 White Linens	7.50	@ 8.25
No. 2 White Linens	5.75	@ 6.75
No. 3 White Linens	4.75	@ 5.25
No. 4 White Linens	3.00	@ 3.50
No. 1 White Cotton	5.50	@ 6.50
No. 2 White Cotton	4.50	@ 5.50
No. 3 White Cotton	3.00	@ 4.00
No. 4 White Cotton	1.90	@ 2.15
Extra Light Prints	2.75	@ 3.25
Ord. Light Prints	2.25	@ 2.50
Med. Light Prints	2.00	@ 2.10
Dutch Blue Cottons	2.25	@ 2.40
French Blue Linens	2.75	@ 2.85
German Blue Linens	2.35	@ 2.55
German Blue Cottons	2.15	@ 2.25
Checks and Blues	1.85	@ 2.00
Lindsay Garments	1.85	@ 1.95
Dark Cottons	1.55	@ 1.60
Old Shopperies	1.50	@ 1.55
New Shopperies	1.50	@ 1.60
French Blues	2.10	@ 2.25

Old Rope and Bagging
(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—		
Foreign	1.60	@ 1.70
Domestic	1.70	@ 1.75
Wool Tares, light	1.60	@ 1.65
Wool Tares, Heavy	1.60	@ 1.70
Bright Bagging	1.60	@ 1.70
Small Mixed Rope	1.25	@ 1.40
Manila Rope—		
Foreign	4.40	@ 4.60
Domestic	4.75	@ 5.00
New Burlap Cut	2.75	@ 3.00
Hessian Jute Threads—		
Foreign	3.50	@ 4.00
Domestic	3.25	@ 3.50

Old Waste Papers
(F. o. b. New York)

Shavings—		
Hard, white, No. 1	3.25	@ 3.50
Hard, white, No. 2	2.40	@ 2.55
Soft, White, No. 1	2.60	@ 2.70
White envelope cuttings	3.00	@ 3.50
Flat Stock—		
Stitchless	1.45	@ 1.55
Overissue Mag.	1.45	@ 1.55
Solid Flat Book	1.40	@ 1.50
Crumpled No. 1	1.00	@ 1.10
Solid Book Ledger	2.00	@ 2.10
Ledger Stock	1.40	@ 1.50
New B. B. Chips	.65	@ .75
Manilas—		
New Env. Cut	2.40	@ 2.60
New Cuttings	1.50	@ 1.75
Extra No. 1 old	1.25	@ 1.35
Print	.75	@ .80
Container	.57½	@ .60
Bogus Wrapper	.75	@ .85
Old Kraft Machine Compressed bales	1.85	@ 2.00
News—		
No. 1 White News	1.65	@ 1.75
Strictly Overissue	.75	@ .80
Strictly Folded	.60	@ .65
No. 1 Mixed Paper	.45	@ .50
Common Paper	.30	@ .35

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Friction Calenders
Embossing Calenders
Hydraulic Presses and Pumps

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WIRES
EASTWOOD WIRE CORPORATION, BELLEVILLE N.J. U.S.A.

Twines
(F. o. b. Mill)

Cotton—			
No. 1	.39	@	.40
No. 2	.37	@	.38
No. 3	.36	@	.37
B. C., 18 basis	.38	@	.40
A. B. Italian, 18 basis	.48	@	.53
Finished Jute—			
Dark 18 basis	.24	@	.25
Light 18 basis	.27	@	.28
Jute Wrapping, 3-6 Ply—			
No. 1	.19	@	.21
No. 2	.18	@	.20
Tube Rope—			
4-ply and larger	.16	@	.17
Fine Tube Yarn—			
5-ply and larger	.21	@	.25
4-ply	.25	@	.29
3-ply	.28	@	.32
Unfinished India—			
Basis	.13	@	.14
Paper Makers Twine			
Balls	.11	@	.12
Box Twine, 2-3 ply	.15	@	.17
Jute Rope	.17	@	.19
Amer. Hemp, 6	.29	@	.31
Sisal Hay Rope—			
No. 1 Basis	.16	@	.18
No. 2 Basis	.14	@	.16
Sisal Lath Yarn—			
No. 1	.14	@	.16
No. 2	.12	@	.14
Manila Rope	.22	@	.24

CHICAGO

Paper
(F. o. b. Mill)

Rag Bond	.30	@	.53¾
Water Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.06¾	@	.11
Superfine writing	.18	@	.24
No. 1 fine writing	.14	@	.18
No. 2 fine writing	.12	@	.14
No. 3 fine writing	.08½	@	.12
No. 1 M. F. Book	.06½	@	.07¾
No. 2 M. F. Book	.05¼	@	.06¾
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
No. 1 Manila	.04¾	@	.05¾
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.04	@	.04½
No. 1 Kraft	.06¼	@	.06½
Southern Kraft	4.25	@	4.50
No. 2 Kraft	.04	@	.04¼
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¼
Manila Tissue—			
24x36 Sheet	.07	@	.07¼
White Tissue—			
20x30 Sheet	.07¼	@	.07½
(Delivered Central Territory)			
News, per ton—			
Rolls, contract	62.00	@	—
Sheets	67.00	@	—
Boards, per ton—			
Plain Chip	37.50	@	42.50
Solid News	47.50	@	—
Solid News	40.00	@	45.00
Manila Lined Chip	50.00	@	55.00
Container Lined—			
85 Test	65.00	@	70.00
100 Test	70.00	@	—

Old Papers
(F. o. b. Chicago)

Shavings—			
No. 1 Hard White	2.20	@	2.25
White Env. Cuttings	2.40	@	2.50
No. 1 Soft Shavings	2.00	@	2.10
No. 1 Mixed	.90	@	1.00
No. 2 Mixed	.70	@	.75
Ledger & Writings	1.25	@	1.35
Solid Books	1.25	@	1.30
Blanks	1.40	@	1.50
Krafts	1.60	@	1.75
New Kraft Cuts	2.15	@	2.25
Manila Envelope Cuttings	1.65	@	1.75
Ex. No. 1 Manila	1.30	@	1.45
Print Manila	.75	@	.80
Folded News (overissue)	.80	@	.85
Old Newspapers—			
No. 1	.65	@	.70
No. 2	.60	@	.65
Mixed Papers—			
No. 1	.60	@	.65
Roofing Stocks—			
(F. o. b. Chicago, net cash)			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper
(F. o. b. Mill)

Bonds	.06	@	.40
Ledgers	.09	@	.40
Writings—			
Superfine	.12½	@	.18
Extra fine	.18	@	.22
Fine	.17	@	.26
Fine, No. 2	.15	@	.25
Fine, No. 3	.10	@	.20
Book, M. F.	.05½	@	.07
Book, S. S. & C.	.06	@	.07½
Book, Coated	.09½	@	.16
Coated Lithograph	.07	@	.11
Label	.07	@	.11
No. 1 Jute Manila	.08	@	.09
Manila Sul., No. 1	.04	@	.05½
Manila No. 2	.03	@	.04
No. 2 Kraft	.06	@	.06½
No. 1 Kraft	.06½	@	.07
Common Bogus	.03½	@	.04
(Delivered Philadelphia)			
News Print Rolls	62.00	@	—
Straw Board	52.50	@	75.00
News Board	40.00	@	40.00
Chip Board	38.00	@	40.00
Wood Pulp Board	85.00	@	95.00
Binder Boards—			
No. 1, per ton	75.00		
No. 2, per ton	70.00		
Carload lots	68.00	@	70.00
Tarred Felts—			
Regular	55.50	@	57.00
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.50	@	1.60
Best Tarred, 3-ply	2.00	@	2.25

Domestic Rags (New)
(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.10½	@	.11
New White, No. 2	.07	@	.07½
Light Silesias	.07	@	.07½
Silesias, No. 1	.07	@	.09
Black Silesia, soft	.05	@	.05½
New Unbleached	.10½	@	.11
Washable, No. 1	.04½	@	.05
Blue Overall	.07½	@	.08
Cottons—According to grades—			
Washable, No. 2	.03	@	—
New Blue	.03	@	.03½
	.05½	@	.06
New Black Soft	.05	@	.05¾
New Light Seconds	.02½	@	.03
New Dark Seconds	1.85	@	2.00
Khaki Cuttings—			
No. 1 O. D.	.05½	@	.05¾
No. 2 Mixed	.04½	@	.04¾
Corduroy	.03	@	.03½
New Canvas	.08½	@	.09
New Black Mixed	.03¾	@	.04½

Bagging
(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.50	@	1.60
Domestic	1.75	@	—
Manila Rope	3.50	@	4.00
Sisal Rope	1.50	@	—
Mixed Rope	1.10	@	1.25
Scrap Burlaps—			
No. 1	1.50	@	1.60
No. 2	1.10	@	1.20
Wool Tares, heavy	3.00	@	—
Mixed Strings	1.15	@	1.25
No. 1, New Light Burlap	2.50	@	2.75
New Burlap Cuttings	2.00	@	2.25

Old Papers
(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	3.20	@	3.25
No. 2 Hard White	2.75	@	3.00
No. 1 Soft White	2.80	@	2.90
No. 2 Soft White	1.80	@	1.90
No. 1 Mixed	1.50	@	1.60
No. 2 Mixed	.90	@	1.00
Solid Ledger Stock	1.85	@	1.90
Writing Paper	1.60	@	1.65
No. 1 Books, heavy	1.40	@	1.50
No. 2 Books, light	1.05	@	1.15
No. 1 New Manila	2.40	@	2.50
No. 1 Old Manila	1.50	@	1.60
Print Manila	.95	@	1.00
Container Manila	.85	@	.90
Old Kraft	2.25	@	2.50
Common paper	.50	@	.55
No. 1 Mixed Paper	.60	@	.65
Straw Board, Chip	.60	@	.65
Binders Board, Chip	.60	@	.65
Overissue News	.80	@	.85
Old Newspaper	.50	@	.55

Domestic Rags (Old)

White, No. 1—			
Repacked	4.25	@	4.50
Miscellaneous	3.50	@	3.75
White, No. 2	2.00	@	2.25
Thirds and Blues—			
Repacked	2.00	@	2.25
Miscellaneous	1.60	@	1.80
Black Stockings (Export)	3.90	@	4.25
Roofing Stock—			
Foreign No. 1	1.65	@	1.75
Repacked	.01¾	@	.02
No. 2	1.30	@	1.35
No. 3 (Rooding)	1.15	@	1.25
No. 4	1.00	@	1.15
No. 5A	.75	@	.85
B	.65	@	.75
C	.65	@	.75

BOSTON

Paper
(F. o. b. Mill)

Ledgers—			
Sulphite	.07½	@	.12½
Rag content	.15	@	.30
All rag	.38	@	.52½
Bonds—			
Sulphite	.06½	@	.11½
Rag content	.15	@	.30
All rag	.36½	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06½
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.06¼	@	.06½
No. 2 Kraft	.04½	@	.05½
Common Bogus	.02	@	.02¾
Delivered New England points			
News Print Rolls	61.50	@	—
Straw Boards, rolls .009			52.50
Straw Board in Sheets, basis 35s to 70s	54.50	@	55.00
Filled News Board	37.50	@	40.00
Chip Board	35.00	@	37.50
Single Manila Lined Chip	50.00	@	—
Single White, Patent Coated Newsboard Bender	65.00	@	80.00
Wood Pulp Board	80.00	@	85.00
Binder Boards	70.00	@	75.00

(F. o. b. Mill)

Tarred Felts—			
Regular, carload lots	65.00	@	—

Old Papers
(F. o. b. Boston)

Shavings—			
No. 1 Hard White	3.25	@	3.75
No. 2 Hard White	2.60	@	2.90
No. 1 Soft White	2.40	@	2.50
No. 1 Mixed	1.10	@	1.15
No. 2 Mixed	.85	@	.90
Solid Ledger Stock	2.35	@	2.45
No. 1 Books, Heavy	1.50	@	1.55
No. 1 Books, Light	—	@	1.15
Manila Env. Cuttings	2.00	@	2.25
No. 1 Old Manila	.90	@	1.00
White Blank News	1.50	@	1.60
Old Kraft	1.75	@	1.80
Print Manila	.80	@	90
No. 1 Mixed Paper	.45	@	.50
Overissue News	.70	@	.75
Old Newspapers	.55	@	.57½
Box Board, Chip	.55	@	.60

Bagging
(F. o. b. Boston)

Gunny No. 1—			
Foreign	—	@	1.50
Manila Rope—			
Foreign	4.50	@	—
Domestic	—	@	4.75
Transmission Rope	—	@	3.00
Mixed Strings	1.00	@	—
Jute Wool Strings	1.00	@	1.05
Jute Carpet Threads	1.05	@	1.15
Scrap Burlaps	1.37½	@	1.50
Scrap Sisal	1.80	@	2.00
Scrap Sisal for shredding	1.85	@	2.00
Wool Tares, heavy	1.60	@	—
New Burlap Cutting	1.90	@	2.00
Australian Wool Pouches	3.00	@	3.12½

Domestic Rags (New)
(F. o. b. Boston)

Shirt Cuttings—			
New White No. 1	.09½	@	.10
Silesias, No. 1	.06	@	.06¼
New Unbleached	.10	@	.10½
Fancy	.04	@	.04½
Washable	.04	@	.04½
Cottons—According to grades			
Blue Overalls	.06¼	@	.06¾
New Black, soft	.04	@	.04¾
Khaki Cuttings	.04	@	.04¾
O. D. Khaki	.05	@	—
Corduroy	.03	@	.03½
New Canvas	.08	@	.08½

Domestic Rags (Old)
(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	4.75	@	5.25
Miscellaneous	5.00	@	—
White No. 2—			
Repacked	.04½	@	.05
Miscellaneous	.03½	@	.04
Twos and Blues	2.75	@	3.00
Thirds and Blues—			
Repacked	2.25	@	2.50
Miscellaneous	1.75	@	1.90
Black Stockings	—	@	4.00
Roofing Stock—			
No. 1	1.65	@	1.75
No. 2	1.45	@	1.55
No. 3	1.05	@	1.10
No. 4	1.10	@	1.15

Foreign Rags
(F. o. b. Boston)

Dark Cottons	—	@	1.55
New No. 1 Shirt Cuttings	9.00	@	9.50
Dutch Blues	2.00	@	2.12½
Lace Curtains	4.75	@	5.00
New Checks & Blues	4.25	@	4.60
Old Fustians	1.90	@	2.00
Old Linsey Garments	1.80	@	1.85

TORONTO

Paper
(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.12½	@	—
No. 2 Sulphite	.10¾	@	—
No. 1 Colored	.13½	@	—
No. 2 Colored	.11¼	@	—
Ledgers (sulphite)	—	@	—
Ledgers, No. 1	.36	@	—
Ledgers, No. 2	.27	@	—
Writing	.09½	@	.10
Book—			
No. 1 M. F. (carloads)	7.50	@	—
No. 2 M. F. (carloads)	7.25	@	—
No. 3 M. F. (carloads)	7.00	@	—
No. 1 S. C. (carloads)	8.00	@	—
No. 2 S. C. (carloads)	7.75	@	—
No. 3 S. C. (carloads)	7.50	@	—
No. 1 Coated and Litho	13.25	@	—
No. 2 Coated and Litho	12.25	@	—
No. 3 Coated and Litho	11.50	@	—
Coated tinted	14.50	@	—
Wrapping—			
Rag Brown	4.95	@	—
White Wrap	5.25	@	—
"B" Manila	5.80	@	—
No. 1 Manila	6.65	@	—
Fiber	6.65	@	—
Kraft, M. F.	7.00	@	—
M. G.	7.00	@	—

(Delivered Toronto)

News, per ton—			
Rolls (contract)	61.50	@	62.00
Sheets	67.00	@	—

Pulp
(F. o. b. Mill)

Ground Wood	30.00	@	31.00
Sulphite easy bleaching	60.00	@	—
Sulphite news grade	60.00	@	—
Sulphite, bleached	77.00	@	78.00
Sulphate	60.00	@	—

Old Waste Paper
(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	3.00	@	—
Soft White Book Shavings	2.85	@	—
White Blk. News	1.60	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	1.40	@	—
Light and Crumpled Book Stock	1.25	@	—
Ledgers and Writings	1.50	@	—
Solid Ledgers	1.50	@	—
Manilas—			
New Manila Cut	1.50	@	—
Printed Manilas	1.00	@	—
Kraft	2.25	@	—
News and Scrap—			
Strictly Overissue	.85	@	—
Strictly Folded	.85	@	—
No. 1 Mixed Paper	.65	@	—

Domestic Rags
(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.09¾	@	.10
Fancy Shirt Cuttings	.06	@	.06¼

Friction at this point can be very expensive.

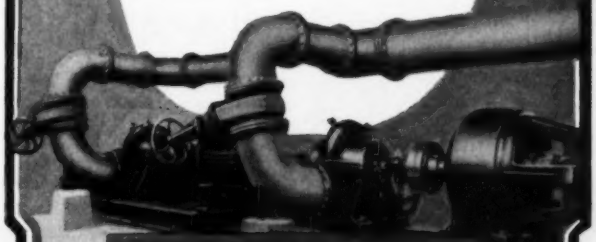
Solutions of Caustic Soda and similar chemicals will wash out the lubricant from ordinary packings that harden and cut the shaft.

CUTNO PACKING

carries in each separate strand a lubricant that successfully resists the cutting action of Caustic Soda and all alkali solutions.

To prevent the destruction of shaft friction use "Cutno" packing, that not only has an abundance of lubricant to overcome the usual shaft friction, but also resists the washing out tendency of the chemical solutions with which it comes in contact.

Let us send you a working sample to test out under your own conditions. State size of packing desired for test.



GREEN, TWEED & CO.
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109 Duane St. New York

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FIFTY-EIGHTH YEAR

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